Selected Cognitive Functions and Activities of Daily Living in Patients with Prescription Drug Use Disorders

ISKENDRI, D.[1]**, ŠŤASTNÁ, L.**[2]

1 | Charles University, First Faculty of Medicine, Department of Addictology, Prague, Czech Republic
2 | General University Hospital in Prague, Department of Addictology, Prague, Czech Republic

Citation | Iskendri, D., & Stastna, L. (2025). Selected Cognitive Functions and Activities of Daily Living in Patients with Prescription Drug Use Disorders. Adiktologie, 25(1), pp–pp.

BACKGROUND: Prescription drug use disorders are increasingly becoming a reason for people contacting addiction services. The onset is often slow and not obvious. People can be very good at hiding the problem from their social environment. When overused, psychoactive medications, particularly sedatives, hypnotics, and/or opioid analgesics, may cause a range of severe health and social difficulties. Some of these issues may be due to cognitive function deficits or impairments which are reflected in various ways in the daily functioning of an individual. **AIM:** The aim of the research is to describe cognitive functions in the users of selected groups of psychoactive prescription drugs and explore any associations between their cognitive deficits and abilities to perform activities of daily living. The main outcomes of the research will include a review study and data analysis. **METHODS:** A test battery was chosen to a conduct general assessment of cognitive functions in patients with a demonstrated addiction to psychoactive medication. The testing methods will be evaluated according to the process manual for each test. A combination of a descriptive approach and partial procedures involved in qualitative data analysis will be used for qualitative analysis. **DISCUSSION:** Studies show that prescription drug use disorders may interfere dramatically with activities of daily living, including impairments affecting attention, memory, planning, and decision making, which has an adverse impact on patients' quality of life. In the Czech Republic, the number of individuals with prescription drug addiction is growing in the long term. Our research highlights the need for a multifactorial approach to the treatment of this type of drug use disorder, as it is key to patients' effective rehabilitation and their return to normal life. Finally, it points out the importance of integrating occupational therapists in treatment, which is a practice that remains underdeveloped in the Czech Republic.

Keywords | **Cognitive Functions – Occupational Therapy – Drug Misuse – Prescription Drug Use Disorder**

Submitted | 14 February 2025 **Accepted |** 11 March 2025

Grant affiliation | This paper was made possible by the institutional support programme Cooperatio, research area Health Sciences, Grant No. 260758 within the Specific Academic Research and the institutional support RVO-VFN64165 (VFN).

Corresponding author | Darina Iskendri, Charles University, First Faculty of Medicine and General University Hospital in Prague, Department of Addictology, Apolinářská 4, 128 00 Prague 2, Czech Republic **darina.iskendri@lf1.cuni.cz**

THEORETICAL BACKGROUND

Cognitive functions involve a range of neurobiological processes responsible for attention, memory, planning, learning, and decision making. Impairment of cognitive functioning is a sign of numerous psychiatric disorders and may significantly affect patients' quality of life and self-sufficiency (Cowen & Sherwood, 2013; Giles et al., 2020; Bartoš, 2022).

Prolonged substance use has a major effect on the quality of cognitive functions. To evaluate the impact of addictive substances on the cognitive functions of an individual requires taking into account a range of correlations in addition to the duration and type of substance use. The substance per se may not necessarily be the only factor contributing to a cognitive deficit. Other factors such as the patient's lifestyle, both past and current social setting, psychological condition, and polydrug use should also be considered (Miovský, 2006).

Some individuals with a history of long-term substance use may experience deterioration of cognitive functioning which may hinder their subsequent reintegration into the labour market. While not always apparent in common activities such as communication, daily routines, or recreational activities, the depletion of cognitive functions may manifest itself in complex work tasks which require the engagement of higher-level cognitive capacities (Kupčík, Charvát, 2014; Kynštová et al., 2023).

Prescription drug misuse involves sedatives, hypnotics, and/or opioid analgesics. In ICD-10, psychoactive medications are covered by the following groups: F11.x Mental and behavioural disorders due to use of opioids (e.g. opioid analgesics) and F13.x Mental and behavioural disorders due to use of sedatives or hypnotics (e.g. benzodiazepines). The F11.x section includes concepts such as abuse, harmful use, misuse, dependence, amnesic syndrome, mood and sleep disorders, and opioid use disorders. In addition, the F13.x section covers persisting cognitive disorders caused by sedatives, mental disorders caused by the use of sedatives and hypnotics, anxiety disorders, dementia, and persisting perceptual impairments caused by sedatives, hypnotics, and anxiolytics.

One key group of prescription drugs coming under these categories comprises benzodiazepines. An association between long-term benzodiazepine use and impaired cognitive functioning was reported by Zetsen et al. (2022). In particular, detrimental effects were found in relation to working memory, episodic memory, attention, and executive functions. According to their study, up to 20% of long-term benzodiazepine users could be classified as cognitively impaired. In addition to impaired cognitive performance, lower quality of life, mainly in terms of physical and social outcomes, was noted by Meyer et al. (2023).

Reallon et al. (2024) investigated the effects of long-term exposure to sedative drugs on the cognition of older adults. Their cognitive functions were assessed using the standardised Mini-Mental State Examination (MMSE). The study showed that high levels of exposure to such drugs were associated with a more rapid decline in the study population's cognitive functioning. Kakatkar et al. (2022) found older people to be at higher risk of developing serious problems as a result of the prolonged use of analgesics, particularly opioids. Such negative outcomes include behavioural and psychological disorders and reduced mobility, which can dramatically affect daily activities and lead to physical injuries. Finally, Neelamegam et al. (2021) concluded that long-term exposure to opioids exceeding a specific cumulative dose may be associated with worse Mini-Mental State Examination (MMSE) measures, which suggests a potential negative effect on cognition. This result supports the need for alternative pain management strategies without adverse effects on cognitive health.

While opioid analgesic use predominates in younger age categories, the consumption of sedatives and hypnotics is more prevalent among individuals aged over 35. Some 12% of the people who use these medications obtain them without a prescription. In 2022 medically unprescribed psychoactive medicines were used by 8-13% of individuals aged over 15. A stable trend in usage was observed in the last five years. Estimates indicate that in the Czech Republic there are 740 thousand to 1.2 million people with problematic use of psychoactive medicines, with 96-125 thousand misusing sedatives, hypnotics, and anxiolytics, and 49-61 thousand opioid analgesics. The rate of psychoactive medication use among women is approximately double that of men and grows with age. Prescription drug misuse can be referred to as any usage of medication which has been shown to be problematic. Generally, two main groups of prescription drug misusers can be defined. The first comprises people with health issues whose primary reason for using drugs is the treatment of their medical condition, but the usage of such drugs goes out of control. The second group comprises individuals with a substance addiction who use psychoactive prescription drugs as a complement to or replacement of other drugs or to alleviate their withdrawal symptoms (Chomynová et al., 2023).

A total of 27.3% of the respondents (24.2% of the men and 30.3% of the women) in a 2021 survey reported that they had used psychoactive medication at some point in their lifetime to relieve pain, with such medication being unprescribed or used contrary to medical recommendation (Chomynová et al., 2022).

In 2023, a total of 75 deaths (64 in 2022) were identified as being associated with overdoses on illicit drugs, psychoactive medications, and inhalants. Four cases involved overdoses on benzodiazepines. 11 cases of benzodiazepine overdoses were reported in 2022 (Chomynová et al., 2023, 2024). Out of the total number of 96 fatal overdoses on illicit drugs, psychoactive medications, and inhalants reported in 2020, benzodiazepines were responsible for 13 deaths (a total of 38 fatal cases were attributed to psychoactive medications). 150-200 thousand people are hospitalised annually because of injuries sustained under the influence of psychoactive medications (Mravčík et al., 2021).

AIMS

The principal aim of this research is to describe cognitive deficits and the level of performance of daily living activities among users addicted to sedatives, hypnotics, and/or opioid analgesics. The cognitive domains of our interest include attention, memory, visual-spatial orientation, and language and verbal production. A test battery will be administered to the respondents. The results of the functional testing will be followed up by the setting-up of optimal rehabilitation of damaged cognitive domains and its application to activities of daily living in such a way as to maximise patients' participation in daily functioning. Signs of functional limitations in domains such as planning, social interaction, and conflict management may be expected with regard to activities of daily living. This also concerns more complex cognitive-behavioural processes, including communication with institutions in relation to various administrative operations. Thus, the objective of this research is to raise both professional and public awareness of the way the medications under study may affect patients' specific cognitive functions and daily living activities in their socioeconomic setting.

RESEARCH QUESTIONS:

Which cognitive and executive functioning domains are impaired by sedatives, hypnotics, and/or opioid analgesics and to what extent?

How can the impairment of cognitive functions as a result of prescription drug misuse affect users' daily living activities?

The research will bring together seemingly different disciplines: addiction science and occupational therapy. In particular, the role of an occupational therapist in cognitive rehabilitation involves sophisticated training in cognitive functions with subsequent projection into functional activities. The goal of occupational therapy is to maximise the level of self-sufficiency in all activities of daily living in the home, social, and work environments (Krivošíková, 2011). Additionally, occupational therapists may assist patients with addiction in areas such as relapse management, productivity and leisure time, priming prevention, and stress management. Occupational therapists play an irreplaceable role in addiction treatment and should therefore be part of the multidisciplinary team (Rodová et al., 2021; Svěcená et al., 2022). Occupational therapy intervention and its role in individuals with substance use disorders, specifically in a therapeutic community, was addressed by Ribeiro et al. (2019). Their results showed that occupational therapy is vital for the restructuring of daily routines, better performance of personal and instrumental activities of daily living, leisure activities, and social functioning. Therapy is viewed as being key to patients' social integration and adaptation. Giles et al. (2020) note the importance of performance-based assessments of functional cognition. However, they highlight the need for the development of standardised, validated, and normed measures used to evaluate this "functional" cognition in order to ensure that these skills also gain greater recognition outside the field of occupational therapy.

STUDY SAMPLE

The study population comprises adult individuals living in the Czech Republic who receive outpatient treatment for their problems related to their use of sedatives, hypnotics, and/or opioid analgesics.

Data will be collected at the Outpatient Addiction Treatment Centre of the Department of Addictology of the First Faculty of Medicine of Charles University and General University Hospital in Prague (Department of Addictology). Participation in the study will be voluntary and contingent on informed consent. The inclusion criteria are as follows: age 18+, misuse of sedatives, hypnotics, and opioid analgesics, consent to participation in the study, and voluntariness. Full anonymity of the participants is guaranteed.

The Department of Addictology admits about 30 patients with prescription drug use disorders to outpatient treatment annually. It is therefore estimated that the study sample will consist of approximately 60 respondents.

Data will be collected at the Department of Addictology for a period of two years by testing patients' cognitive functions using a selected test battery for assessing cognitive potential.

After having their history taken using a short questionnaire, the patients will be tested by means of the following selected test batteries: Addenbrooke's Cognitive Examination (ACE-R) (Mathuranath et al., 2000; Mioshi et al., 2006), the Brief Executive Function Assessment Tool (Berry et al., 2021, 2022), the Loewenstein Occupational Therapy Cognitive Assessment (Katz et al., 1989), the Frontal Assessment Battery (Dubios et al., 2000), the Dysexecutive Questionnaire (Wilson et al., 1996), and the Beck Depression Inventory (Beck et al., 1961). In addition, the patients' functional independence and self-sufficiency will be assessed using the Barthel Index (the original version) (Mahoney & Barthel, 1965) and the Instrumental Activities of Daily Living Scale (Lawton & Brody, 1969). A descriptive approach will be combined with selected qualitative data analysis procedures to perform qualitative analysis of the data.

Addenbrooke's Cognitive Examination-Revised (ACE-R) is a widely used neuropsychological test designed to assess a wide range of cognitive functions. It covers the attention/orientation, memory, language, fluency, and visuospatial domains. It is intended to detect various forms of dementia and cognitive impairments. ACE-R is effective in identifying early cognitive dysfunction (Mioshi et al., 2006).

Used to screen for cognitive impairment, the Brief Executive-Function Assessment Tool (BEAT) was designed for the rapid and effective evaluation of executive functions in individuals who may be affected by psychoactive substance use. This measure may be useful for practitioners working in addiction services as the first step in identifying individuals who may benefit from further assessment or treatment intervention aimed at improving their cognitive funcions (Berry at al., 2022).

The Loewenstein Occupational Therapy Cognitive Assessment (LOTCA) is an extensive battery used in occupational health to measure cognitive abilities. The assessment covers a wide range of cognitive domains, including orientation, visual perceptual and psychomotor abilities, and thinking operations, which makes it possible for therapists to obtain a comprehensive picture of patients' cognitive functioning and plan individualised rehabilitation. Rojo-Mota et al. (2017) described the potential for the use of the LOTCA battery in patients with substance use disorders.

The Frontal Assessment Battery (FAB) is a brief tool designed to evaluate executive functioning with a specific focus on such assessment being used in clinical practice to diagnose various neurological diseases. Studies have shown that the FAB may be an appropriate tool to evaluate executive functions. It is easy and quick to administer (Hurtado-Pomares et al., 2018).

The Dysexecutive Questionnaire is intended to measure everyday manifestations of the dysexecutive syndrome. It makes it possible to assess how executive dysfunction affects the daily life of an individual. The questionnaire is designed as a self-report measure for patients to rate various aspects of their behaviour and cognitive functions, such as planning, decision making, flexible thinking, and social behaviour (Simblett et al., 2015).

The Beck Depression Inventory was chosen because depression is often considered a major psychological symptom in users of psychoactive medications. The scale contains 21 self-report items involving patients' subjective assessment of relevant symptoms over a one-week period (Lee et al., 2018).

The Barthel Index and the Instrumental Activities of Daily Living Scale evaluate patients' functional independence. The Barthel Index focuses on personal activities of daily living (pADL) which are typically directly associated with the person under examination. The domains include feeding, dressing, personal hygiene, bathing, locomotion, mobility, transfers, and continence. The test consists of ten items, with the maximum score being 100 points. The Instrumental Activities of Daily Living Scale (iADL) assesses activities that can be delegated to another person. Such activities include shopping, cooking, and handling finances or medication (Krivošíková, 2011).

ETHICAL ASPECTS OF RESEARCH The ethical aspects of the entire study will be covered by a research approval of the Ethics Committee of the General University Hospital in Prague. The patients will be included in the study following their written informed consent. Signed consent forms will be archived as required. The informed consent forms will also include all relevant information and important contact details. The objectives and course of the study will be comprehensibly explained to the patients prior to their participation. The respondents will have the opportunity to ask any additional questions and withdraw from the study at any point if they wish to. Everything is based on voluntariness. Anonymity and other ethical aspects will be strictly maintained throughout the study.

DATA ANALYSIS METHODS

The preparation and processing of the data for analysis will be contingent on the results of the testing. The entire procedure, including the collection, processing, validation, and storing of the data, will follow the rules for clinical data management. This will ensure the reliability and accuracy of the data and, accordingly, the reliability and veracity of the study as a whole.

The data will be processed using a combination of quantitative and qualitative approaches. After the data collection has been completed, the test battery results will be evaluated according to standardised procedures outlined in the manuals for the individual tests. The results will be subjected to statistical analysis using descriptive statistics and applicable inference methods, such as analysis of variance (ANOVA) and multiple regression analysis, in order to identify the relationships between cognitive functioning and abilities to perform activities of daily living (Kim et al., 2024).

The qualitative data obtained by means of questionnaires and open-ended responses will be analysed using thematic analysis. Special emphasis will be placed on the identification of patterns and key topics related to the respondents' life circumstances and their abilities to adapt to changes in daily functioning (Saunders et al., 2023).

LIMITATIONS

One limitation of this work may be the method used for recruiting respondents; the small sample may prevent good statistical analysis. Another aspect may be the accumulation of respondents from the area around Prague, where the data collection centre – the outpatient addiction treatment clinic of the Department of Addictology – is located.

Another major limitation of the study is the possibility of some of the respondents still being under the influence of psychoactive substances when being tested. This could compromise the testing results because of the lasting effects of the substances, withdrawal symptoms, or variations in the reduction of dosage. The absence of testing consistency in specific treatment stages may be a substantial weakness of the study. The impact of this variability on the results may be difficult to interpret, which may complicate their accurate comparison and generalisation.

Another factor is the heterogeneity of the study sample: the respondents may differ not only in the type and duration of substance use, but also in psychosocial factors such as social support and general health status. These differences may have an influence on their cognitive function and ability to perform activities of daily living.

Finally, there is a risk of some respondents withdrawing from the study because of their mental or physical problems. This could lead to the further reduction of the study sample and limit the possibilities of both qualitative and quantitative analysis.

DISCUSSION

The aim of this study is to describe impaired cognitive functions among users of psychoactive medications, specifically sedatives, hypnotics, and/or opioid analgesics. In the Czech Republic the prevalence of prescription drug misuse is rising on a year-on-year basis (Chomynová et al., 2023; Institute of Health Information and Statistics, 2024).

Cognitive functions, including attention, memory, planning, and decision making, are essential for the everyday functioning of an individual and their impairment may dramatically affect the quality of life (Cowen & Sherwood, 2013). A number of studies (including Crowe et al., 2018; Meyer et al., 2023; Reallon et al., 2024) have reported poorer cognitive outcomes in patients with prescription drug use disorders. A meta-analysis by Crowe and Stranks (2018) found that long-term use of benzodiazepines leads to moderate to long-term cognitive deficits, most significantly affecting working memory, episodic memory and executive function, and reducing the adaptability of these individuals in everyday life. Our study provides a more detailed insight into the relationship between specific cognitive deficits and their impact on the ability to perform daily activities through a broader test battery. For example, a study by Reallon et al. (2024), which focused on the cognitive impact of long-term sedative use in an older population, measured cognitive decline using a standardized test - the Mini-Mental State Examination (MMSE). In contrast, our study will use a wider range of cognitive tests allowing a more detailed assessment of the impact on cognitive function. These cognitive impairments not only affect specific domains of cognition but also have significant implications for individuals' ability to carry out daily activities, maintain employment, and engage in social interactions.

Addiction to psychoactive substances may have serious implications for the daily functioning of an individual. Such a condition often leads to the disruption of a person's ability to fulfil their daily tasks, has an adverse effect on work performance, and complicates social interaction. People with substance addiction may lose interest in activities they considered important before and their attention and decision-making abilities may become impaired. This state may lead to conflicts in family and work relationships, as addiction is often conducive to unreliability, irritability, and emotional instability (e.g. Maurage, Rolland, & Pitel, 2023). Therefore, it is essential to provide these patients with special care. It is key that their social reintegration is the centre of attention, in addition to the rehabilitation of their cognitive functioning. The restoration of cognitive functioning is necessary for these individuals to resume their functioning in daily life and work settings. To help patients reestablish their disrupted relationships and improve their quality of life is also of major importance. A comprehensive approach to addiction treatment, including both cognitive training and social reintegration support, may contribute significantly to their successful return to everyday life.

While inspired by previous international research projects, the test battery chosen for this study also takes into account the resources of the workplace and the availability of the testing methods (Votavová, Šťastná, 2023). Although some research studies have employed the widely used Mini-Mental State Examination (MMSE) to evaluate cognitive functions, this research will apply Addenbrook's Cognitive Examination (ACE-R), as it addresses certain items in greater detail and can reveal subtle nuances of cognitive dysfunction while incorporating the aforementioned MMSE. In addition, the study engages the Brief Executive-function Assessment Tool (BEAT) and the Loewenstein Occupational Therapy Cognitive Assessment (LOTCA), which are also recommended for use in patients with substance use disorders (e.g. Royo-Mota et al., 2017; Berry et al. 2022; Meyer et al., 2023). The study also involves easier-to-process tests and questionnaires, including occupational health tests for evaluating functional independence, as a source of additional information about the patients' general condition.

Finally, an important objective of the study is to describe the work of an occupational therapist in an outpatient addiction treatment facility. The reason is that while it is rather common globally for occupational therapists to be part of multidisciplinary teams providing services to people with substance use disorders, in the Czech Republic their work is not routinely incorporated in addiction treatment.

Authors' contributions: Both authors designed the study and proposed the study design. The author DI designed the initial form of the article. The author DI conducted the literature review and prepared the summary of related work. The author LŠ participated in the preparation of the article. Both authors contributed to the creation of the article and approved the final version of the manuscript.

Declaration of interest: The authors of the article do have not any conflict of interest.

REFERENCES

Bartoš, A. (2022). Cognitive functions, activities of daily living and cognitive syndromes. Online. *Psychiatrie pro praxi*. Vol. 23, No. 2, pp. 91-97. ISSN 12130508. https://doi.org/10.36290/psy.2022.021.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561-571. https://doi.org/10.1001/archpsyc.1961.01710120031004

Berry, J., Nardo, T., Sedwell, A., Lunn, J., Marceau, E., Wesseling, A., Zucco, M., Sugden-Lingard, S., Borchard, T., Batchelor, J., & Shores, E. A. (2021). *Development and validation of the Brief Executive function Assessment Tool.* Sydney: Agency for Clinical Innovation.

Berry, J., Shores, E. A., Nardo, T., Sedwell, A., Lunn, J., et al. (2022). Brief executive-function assessment tool: A new cognitive impairment screening tool for alcohol and other drug services. Online. *Applied Neuropsychology: Adult*. Vol. 29, No. 6, pp. 1511-1521. ISSN 2327-9095. https://doi.org/10.1080/23279095.2021.1895791.

Chomynová, P., Grohmannová, K., Dvořáková, Z., Černíková, T., Orlíková, B., Rous, Z., Jarošíková, H., Franková, E., Dékány, L., Fidesová, H., & Vopravil, J. 2022. *Zpráva o nelegálních drogách v České republice 2022* [Report on Illicit Drugs in the Czech Republic 2022] Chomynová, P. (Ed.). Praha: Úřad vlády České republiky.

Chomynová, P., Grohmannová, K., Dvořáková, Z., Orlíková, B., Černíková, T., Galandák, D., & Franková, E. 2023. *Zpráva o problematickém užívání psychoaktivních léků v České republice 2023* [Report on the Use of Problematic Psychoactive Medicines in the Czech Republic 2023] Chomynová, P. (Ed.). Praha: Úřad vlády České republiky.

Chomynová, P., Dvořáková, Z., Grohmannová, K., Orlíková, B., Černíková, T., Franková, E., Galandák, D., Fidesová, H., & Vopravil, J. 2024. *Zpráva o nelegálních drogách v České republice 2024* [Report on Illicit Drugs in the Czech Republic 2024] Chomynová, P. (Ed.). Praha: Úřad vlády České republiky.

Cowen, P., & Sherwood, A. C. (2013). The role of serotonin in cognitive function: evidence from recent studies and implications for understanding depression. *Journal of Psychopharmacology* [Online]. 27(7), 575-583 [Cit. 2023-09-07]. ISSN 0269-8811. doi:10.1177/0269881113482531.

Crowe, S. F., & Stranks, E. K. (2018). The Residual Medium and Long-term Cognitive Effects of Benzodiazepine Use: An Updated Meta-analysis. Online. *Archives of Clinical Neuropsychology*. Vol. 33, No. 7, pp. 901-911. ISSN 1873-5843. https://doi.org/10.1093/arclin/acx120.

Dubois, B., Slachevsky, A., Litvan, I., & Pillon, B. (2000). The FAB. *Neurology,* 55(11), 1621-1626. https://doi.org/10.1212/wnl.55.11.1621

Giles, G. M., Edwards, D. F., Baum, C., Furniss, J., Skidmore, E., et al. (2020). Making Functional Cognition a Professional Priority. Online. *American Journal of Occupational Therapy*. Vol. 74, No. 1, pp. 7401090010p1-7401090010p6. ISSN 0272-9490. https://doi.org/10.5014/ajot.2020.741002.

Hurtado-Pomares, M., Terol-Cantero, M. C., Sánchez-Pérez, A., Peral-Gómez, P., Valera-Gran, D., et al. (2018). The frontal assessment battery in clinical practice: a systematic review. Online. *International Journal of Geriatric Psychiatry*. Vol. 33, No. 2, pp. 237-251. ISSN 0885-6230. https://doi.org/10.1002/gps.4751.

Institute of Health Information and Statistics of the Czech Republic (n.d.). Návykové látky. *Významná témata* [Addictive Substances. Topics]. Retrieved on 19 August 2024 from https://www.uzis.cz/index.php?pg=vystupy--vyznamna-temata--navykove-latky.

Kakatkar, S., Narayan, A., & Balkrishnan, R. (2022). Prescription analgesic overuse in older adults: Can we mitigate this growing problem? Online. *Aging Medicine*. Vol. 5, No. 4, pp. 294-296. ISSN 2475-0360. https://doi.org/10.1002/agm2.12228.

Katz, N., Itzkovich, M., Averbuch, S., & Elazar, B. (1989). Loewenstein Occupational Therapy Cognitive Assessment (LOTCA) battery for brain-injured patients: reliability and validity. *The American Journal of Occupational Therapy: Official Publication of the American Occupational Therapy Association*, *43*(3), 184-192. https://doi.org/10.5014/ajot.43.3.184.

Kim, Jonghae; Kim, Dong Hyuck A Kwak, Sang Gyu (2024). Comprehensive guidelines for appropriate statistical analysis methods in research. Online. *Korean Journal of Anesthesiology. Vol. 77, No. 5, pp. 503-517. ISSN 2005-6419.*

Krivošíková, M. (2011). *Úvod do ergoterapie* [Introduction to Occupational Therapy]. Praha: Grada. ISBN 978-80-247-2699.

Krupčík, O., & Charvát, M. (2014). Diagnostika kognitivních funkcí u léčených klientů s anamnézou dlouhodobého užívání návykových látek [Diagnostics of Treated Patients with an Anamnesis of Long-term Drug Use]. *Psychologie a její kontexty* [online]. 5 (Supplement), 89-115.

Kynštová, H., Zahrádka Köhlerová, M., & Jedličková, K. (2023). Kognitivní funkce u osob se závislostí na psychoaktivních látkách: Přehled problematiky [Cognitive Functions in People with Substance Addiction: a Review]. *Drugs & Forensics* Bulletin NPC. No. 4, pp. 25-30.

Lawton, M. P., & Brody, E. M. (1969). *Instrumental Activities of Daily Living Scale (IADL)* [Database record]. APA PsycTests.

Lee, K., Kim, D., & Cho, Y. (2018). Exploratory Factor Analysis of the Beck Anxiety Inventory and the Beck Depression Inventory-II in a Psychiatric Outpatient Population. Online. *Journal of Korean Medical Science*. Vol. 33, No. 16. ISSN 1011-8934. https://doi.org/10.3346/jkms.2018.33.e128.

Mahoney, F. I., & Barthel, D. W. (1965). Functional Evaluation: The Barthel Index. *Maryland State Medical Journal*, *14*, 61-65.

Mathuranath, P. S., Nestor, P. J., Berríos, G. E., Rakowicz, W., & Hodges, J. R. (2000). A brief cognitive test battery to differentiate Alzheimer's disease and frontotemporal dementia. *Neurology,* 55(11), 1613-1620. https://doi.org/10.1212/01.wnl.0000434309.85312.19

Maurage, P., Rolland, B., Pitel, A.-L., et al. (2023). Five Challenges in Implementing Cognitive Remediation for Patients with Substance Use Disorders in Clinical Settings. *Neuropsychology Review.* https://doi.org/10.1007/s11065-023-09623-1.

Meyer, M., Gygli, F., Westenberg, J. N., et al. (2023). Benzodiazepine use, quality of life and psychiatric symptom burden in oral and injectable opioid agonist treatment: a cross-sectional study. *Addiction Science & Clinical Practice* 18, 43. https://doi.org/10.1186/s13722-023-00397-8.

Mioshi, E., Dawson, K., Mitchell, J. C., Arnold, R., & Hodges, J. R. (2006). The Addenbrooke's cognitive examination revised (ace‐r): a brief cognitive test battery for dementia screening. *International Journal of Geriatric Psychiatry,* 21(11), 1078-1085. https://doi.org/10.1002/gps.1610

Miovský, Michal. (2006). Kognitivní deficity způsobené užíváním návykových látek [Cognitive Deficits Caused by Substance Use]. In: Preiss, M., Kučerová, H. *Neuropsychologie v psychiatrii*. Praha: Grada Publishing a.s.. ISBN 80-247-1460-4.

Mravčík, V., Chomynová, P., Grohmannová, K., Janíková, B., Rous, Z., Grolmusová, L., Franková, E., & Nechanská, B. 2021. Zpráva o problematickém užívání psychoaktivních léků v České republice 2021 [Report on Problematic Use of Psychoactive Medicines in the Czech Republic 2021] Mravčík, V. (Ed.). Praha: Úřad vlády České republiky.

Neelamegam, M., Zgibor, J, Chen, H., O'Rourke, K., Bakour, C., et al. (2021). The effect of opioids on the cognitive function of older adults: results from the Personality and Total Health through life study. Online. *Age and Ageing.* Vol. 50, No. 5, pp. 1699-1708. ISSN 0002-0729. https://doi.org/10.1093/ageing/afab048.

Reallon, E., Gervais, F., Moutet, C., et al. (2024). Impact of cumulative exposure to anticholinergic and sedative drugs on cognition in older adults: a memory clinic cohort study. *Alzheimer Research* & *Therapy* 16, 163. https://doi.org/10.1186/s13195-024-01530-8.

Ribeiro, J., Mira, E., Lourenço, I., Santos, M., & Braúna, M. (2019). Intervenção da Terapia Ocupacional na toxicodependência: estudo de caso na Comunidade Terapêutica Clínica do Outeiro – Portugal [Occupational therapy intervention in drug addiction: a case study of the Outeiro Therapeutic Community - Portugal]. Online. *Ciência & Saúde Coletiva.* Vol. 24, No. 5, pp. 1585-1596. ISSN 1678-4561. https://doi.org/10.1590/1413-81232018245.04452019.

Rodová, Z., Jandáč, T., Jarošová, Z., Gašparová, P., Veselková, E., & Kiss-Szemán, B. (2021). Rovnováha aktivit u klienta po pádu v ebrietě – kazuistická studie [Occupational Balance in a Client Recovering from a Trauma Suffered while Intoxicated – a Case Study]. *Adiktologie pro preventivní a léčebnou praxi*; 4(1), 22-27; https://doi: 10.35198/APLP/2021-001-0002.

Rojo-Mota, G., Pedrero-Pérez, E. J., Ruiz-Sánchez De León, J. M., León-Frade, I., Aldea-Poyo, P., et al. (2017). Loewenstein Occupational Therapy Cognitive Assessment to Evaluate People with Addictions. Online. *Occupational Therapy International*. Vol. 2017, pp. 1-7. ISSN 0966-7903. https://doi.org/10.1155/2017/2750328.

Saunders, C, H., Sierpe, A., Von Plessen, Ch., Kennedy, A., Leviton, L. C. et al. (2023). Practical thematic analysis: a guide for multidisciplinary health services research teams engaging in qualitative analysis. Online. *BMJ. S. /bmj/381/bmj-2022-074256.atom. ISSN 1756-1833.*

Simblett, S. K., Ring, H., & Bateman, A. (2015). The Dysexecutive Questionnaire Revised (DEX-R): An extended measure of everyday dysexecutive problems after acquired brain injury. Online. *Neuropsychological Rehabilitation.* Vol. 27, No. 8, pp. 1124-1141. ISSN 0960-2011. https://doi.org/10.1080/09602011.2015.1121880.

Svěcená, K., Rodová, Z., Vrbská, V., Sládková, P., Zahradnická, I., Ťoupalová, N., & Vlasáková, M. (2022). Možnosti uplatnění ergoterapeuta v oboru adiktologie [Opportunities for an Occupational Therapist in the Field of Addictology]. *Adiktologie pro preventivní a léčebnou praxi*. 5 (2), 94-101; https://doi.org/10.35198/APLP/2022-002-0003.

Votavová, A., & Šťastná, L. (2023). *Rehabilitation of Executive Functions in Users of Addictive Substances. Study Protocol. Adiktologie,* 23 (3), 241-249. https://doi.org/10.35198/01-2023-003-0004.

Wilson, B. A., Alderman, N., Burgess, P. W., Emslie, H., & Evans, J. J. (1996). Behavioural Assessment of the Dysexecutive Syndrome. Bury St Edmunds, England, Thames Valley Test Company.

Zetsen, S. P. G., Schellekens, A. F. A., Paling, E. P., Kan, C. C. A., & Kessels, R. P. C. (2022). Cognitive Functioning in Long-Term Benzodiazepine Users. Online. *European Addiction Research.* Vol. 28, No. 5, pp. 377-381. ISSN 1022-6877. https://doi.org/10.1159/000525988