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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

ТБИЛИСИ - НЬЮ-ЙОРК

GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board and The International Academy of Sciences, Education, Industry and Arts (U.S.A.) since 1994. **GMN** carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

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2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

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3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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KAZAKH ADAPTATION OF THE MONTREAL COGNITIVE ASSESSMENT (MOCA)

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Introduction. Cognitive impairment (CI) often accompanies Parkinson's Disease (PD) and occurs when regulation of serotonergic, noradrenergic or cholinergic neurotransmitter systems is disrupted [1]. To date, several prospective and cross-sectional studies on the prevalence of CI in PD have been conducted, as a result of which it was found that CI in PD occurs in up to 70% of cases, depending on disease severity, the prevalence of dementia is estimated to be as high as 24 million globally. It is estimated that cases of dementia will double every 20 years through 2040, resulting in a huge health care burden [2-4]. In the International Parkinson and Movement Disorder Society(MDS) guidelines, CI in PD are divided into two groups: mild cognitive impairment (MCI) and dementia in PD [5]. CI is heterogeneous in symptoms, severity, and progression. In accordance with MDS diagnostic criteria, dementia in PD develops gradually and includes disorders in more than one cognitive area, combined with an impact on daily activities [6]. Therefore, the main difference between CI in PD and dementia in PD is the absence of a limiting effect on the patient's daily activities [7].

The MDS Task Force [8] proposed clinical criteria [6] and an algorithm for diagnosing dementia in PD [9], according to which, the diagnosis of "Dementia in PD", is assigned in cases of dysfunction in more than one cognitive area (attention, executive functions, visual-spatial orientation, memory and speech) which limit daily activities [10]. For this reason we chose a clinical group as the study group in this adaptation. Diagnosis of CI in PD in clinical practice includes a carefully collected patient and family history, neuropsychological evaluation and neuroimaging. According to MDS recommendations, the use of the Montreal Cognitive Assessment (MoCA) as a screening tool for detection of CI in PD is preferred over the widely used MMSE (Mini Mental State Examination Scale), due to a more detailed assessment of executive skills in the former [11]. According to a meta-analysis by Ciesielska et al., MoCA better meets the criteria for screening tests for moderate CI in patients over 60 years of age than MMSE [12]. More so, MoCA has the discriminatory ability to distinguish healthy individuals in a control group from subjects with MCI or mild Alzheimer's disease [13].

The MoCA scale is widely used all over the world. Although due to strong cultural dependence, it has been widely revised in various countries. Due to the obvious difference in culture and lifestyle between nationalities, given the atypical illustrations, incomprehensible words and lack of understanding, MoCA requires further evaluation and possibly revision in order to better adapt to the Kazakh language. The best illustration of the MoCA protocol should help minimize unnecessary disputes and difficulties among Kazakh patients with Parkinson Disease. This study was designed to use MoCA to study mild cognitive impairment in Kazakh patients with PD. Moreover, we hope to further modify MoCA in clinical practice so that it conforms to Kazakh cultural traditions, life habits and experience, as well as to increase its reliability and validity for the Kazakh population. The use of unified scales facilitates the objective assessment of the patient's condition and allows timely diagnosis of CI in PD. In order to adapt the scales for use in the Kazakh-speaking population, it is necessary to carry out validation and, accordingly, to assess the reliability of Kazakh-speaking versions. The study is rated Class III because of the cross-sectional study design and the absence of diagnostic uncertainty regarding the presence or absence of MCI in PD patients in the included patients.

The aim of our study was to provide a linguo-cultural adaptation of the original version of the Montreal cognitive assessment (MoCA) scale (version 7.1) with an assessment reliability of the Kazakh-language version.

Materials and methods. ***Study characteristics***. The study involved 50 adult patients with a diagnosis of Parkinson's disease in accordance with the clinical criteria of MDS et al. [8] (Table 1). The study was performed in accordance to STARD guidelines (http://www.equator-network.org/reporting-guidelines/stard). Patients were selectively included in the study according to inclusion and exclusion criteria. Criteria for inclusion of patients in the prospective study: clinically "reliable" Parkinson's disease (MDS, 2015); knowledge of the Kazakh language; written consent to participate in neuropsychological testing. Exclusion criteria: patients with diagnoses: parkinsonism syndrome, essential tremor, progressive supranuclear palsy, Lewy body dementia, Alzheimer's disease, unwillingness to participate in the study. Patient participation in the study abided by the principles of the Helsinki Declaration. The conclusion of the local bioethical commission of the West Kazakhstan Marat Ospanov Medical University (No.20 from 09.04.2019, session No. 3) was obtained. 27 patients had higher education, 23 patients - secondary education. The average score on the Movement Disorder Society Unified Parkinson's Disease Rating Scale for men was 40.6 ± 21.5, for women - 41.9 ± 22.8.

Table 1. Patient demographics and disease duration

Sex	**Number of patients (n)**	**Age, years (mean±standard deviation)**	**Disease duration, years (mean±standard deviation)**
Male	15	63.5±8.9	5.6±2.9
Female	35		

MoCA translation and adaptation. The criteria for translator's competencies were obtained from developers of the MoCA (Version 7.1). The translators met all the criteria: a medical professional with experience in neuropsychological testing; a university employee; a native of the country where the language is spoken (Kazakhstan); fluent in the language to be translated (Kazakh) [14].

An agreement with the MoCA (Version 7.1) developers on compliance of translators with existing criteria was obtained. As part of the validation procedure, the translation of the MoCA scale was carried out from English into Kazakh by three independent translators (two neurologists of Kazakh nationality who are fluent in English and one professional translator without a medical education). The three translation options were then discussed by a working group consisting of two neurologists who are fluent in English. Each item on the scale was voted on for validation.

A professional translator who was not familiar with the English version of the MoCA, made a reverse translation of the Kazakh-language version into English. The back-translated version was revised to take into account linguistic and semantic equivalents and was approved by the creators of the scale. Lastly, the final Kazakh version of MoCA was validated on a pilot trial of 50 patients with PD, which is necessary in order to determine the acceptability of translations (instructions, questions and answers) for local clinical application. Two main aspects were checked – the equivalence of points and answer options in translation from the original. At the end of the survey, the interviewer asked the subject if he had problems understanding the questionnaire. During the survey, the wording of the questions and answer options were adjusted based on the wishes of the respondents.

Clinical evaluation of cognitive functions was carried out according to the following algorithm: anamnesis evaluation, assessment on the Montreal scale of cognitive functions MoCA. When studying the reliability of the Kazakh-language version of the MoCA scale, internal consistency was then assessed using the Cronbach's alpha coefficient [13].

Statistical evaluation. The volume of the representative sample corresponded to generally accepted recommendations [15]. The number of patients was sufficient as the population was homogeneous (only patients with Parkinson's disease) [16]. The sample size (n=50) was sufficient, assuming a deviation of 0.26 points from the theoretically true sample average. The intra-test uniformity and reliability of the scale were evaluated by calculating the Cronbach's alpha coefficient.

Results. The Kazakh version of the Montreal Cognitive Assessment was developed in accordance to existing translation and adaptation guidelines (Fig 1). Statistical evaluation (Table 1) showed that the Cronbach's alpha coefficient was 0.77. According to existing concepts, the value of the Cronbach's alpha coefficient within the range of 0.70–0.80 is sufficient for application in research, while a value of >0.90, shows applicability in clinical practice [14]. Our results show that the Kazakh adaptation can be recommended for use in research.

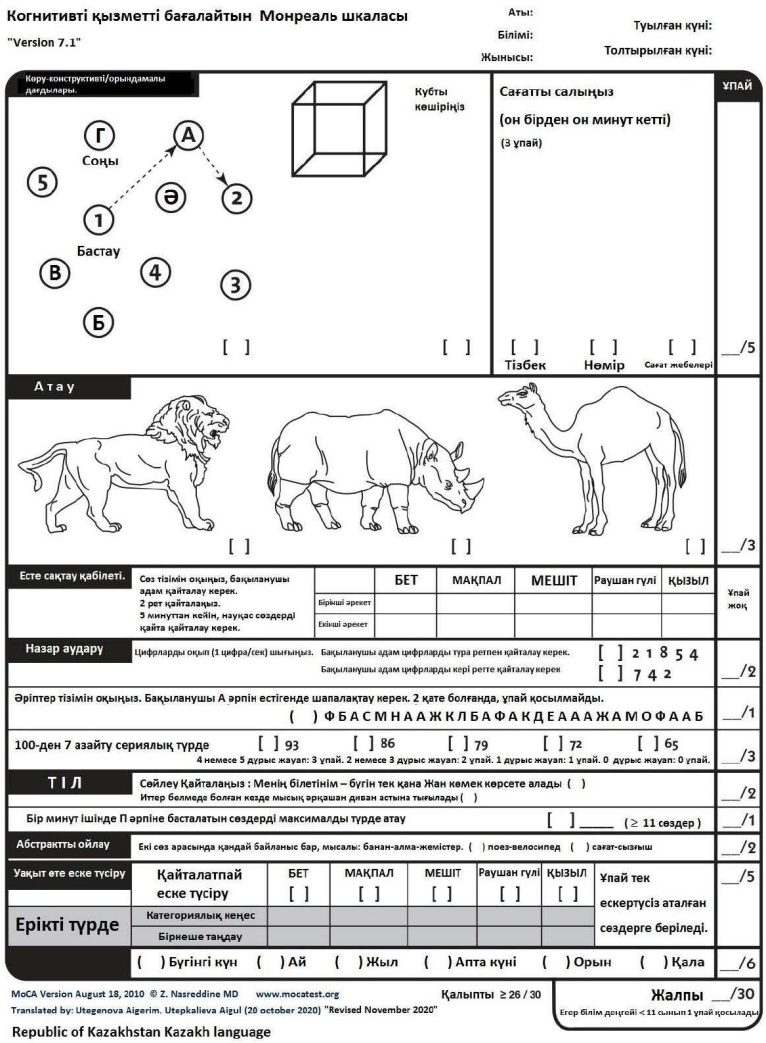

Fig. 1. Kazakh adaptation of MoCA.

Results of assessing the cognitive status of studied patients according to MoCA. The evaluated patients in most cases demonstrated impairments in visual-constructive, executive skills, short-term memory, and abstract thinking. No adverse effects were noted throughout testing.

Discussion. Regional adaptations of the MoCA have been undertakenin several different countries. Validation of the MoCA was performed by Yali Zhai on patients in the Chinese population, with a Cronbach's alpha coefficient of 0.862 ($p<0.01$). When the MoCA cut-off point score was 28, the Area under the ROC curve (AUC - Area Under Curve) was 0.859 [17]. Validation on Japanese population conducted by Fujiwara et al. showed Cronbach's alpha of 0.74. The reliability of the MoCA retest-test using intra-class correlation coefficient between the scores at the initial examination and subsequent examination after 8 weeks was 0.88 ($p<0.001$) [18]. According to Razali et al, validation of the MoCA in Malaysian patients showed good internal consistency with the Cronbach's alpha of 0.80 [19]. Similar results were presented by the Brazilian researchers Claudia et al., the Cronbach's alpha coefficient for MoCA in the presented studies was 0.75. Time stability-retest (repeated testing after 3 months) when using the MOS of intra-class correlation, resulted in a Cronbach's coefficient of 0.75 ($p<0.001$). MoCA for MCI were 81% and 77%, respectively, with a cutoff of 25 points. The area under the ROC curve for MCI prediction was 0.82 to 0.06 [20]. This article focused on language adaptation of the scale and the main statistical test (Cronbach's alpha) measured the internal consistency of the test.

Study limitations included small sample size, though within acceptable limits. Lack of validation premise, which can be later assessed in follow up studies, as the main goal of the current study was primary evaluation of the MoCA Kazakh adaptation reliability. The results further present a cohort generalization, as it was tested on a clinical population. Nonetheless, these limitations do not undermine the validity of the study assessing the Kazakh linguo-cultural adaptation of the MoCA tool.

Our results show that the MoCA is a reliable tool in its current adaptation to the Kazakh language. This will allow further use of the MoCA tool, significantly expanding the inclusion of Kazakh population in multinational and large scale studies. This has substantial implications in research collaboration, standardization of patient care and treatment quality improvement. The tendency to follow uniform and internationally adapted tests is a result of natural globalization of medical research. Our study presents the development of an official Kazakh-language version of the Montreal Cognitive Assessment for assessing the cognitive status of patients with PD, which will help expand the participation of Kazakh-speakers in research aiming to evaluate cognitive disorders in patients with PD and other diseases of the nervous system.

Conclusion. The result of this study was the linguo-cultural adaptation of the official Kazakh-language version of the Montreal Cognitive Assessment (MoCA) tool for assessing the cognitive status of patients with PD, which will expand the participation of Kazakh-speaking people in multicenter and international studies in order to assess cognitive impairment in patients with PD and other diseases of the nervous system.

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KAZAKH ADAPTATION OF THE MONTREAL COGNITIVE ASSESSMENT (MOCA)

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Abstract. Objective. The Montreal Cognitive Assessment (MoCA) is a brief cognitive evaluation tool that has been developed for screening of patients for Mild Cognitive Impairment (MCI). MCI is a recognized high-risk state for Alzheimer's disease development. The aim of the present study was to create a Kazakh-language adaptation of the original version of the Montreal Cognitive Assessment (version 7.1) and evaluate its reliability by determining internal consistency using the Cronbach's alpha coefficient. **Materials and methods.** This prospective study involved 50 patients diagnosed with Parkinson's disease in accordance with the 2015 MDS clinical criteria with diagnosed MCI according to clinical guidelines of the Movement disorder society (MDS). Clinical and neuropsychological evaluation were carried out on all patients. Results. The internal consistency and reliability of the translated scale were investigated by means of the Cronbach alpha coefficient. The Cronbach's alpha coefficient for the MoCA Kazakh version was 0.77. Conclusion. While the evaluation of discriminatory validity was not performed in this study, the Kazakh adaptation of the MoCA was shown to be a reliable tool for screening MCI among patients with Parkinson's Disease.

Keywords. MoCA, mild cognitive impairment, neuropsychology, cognitive assessment, neuropsychologicaltests.