IMPACT OF THE COVID-19 PANDEMIC ON QUALITY OF LIFE AND COVID-19 PSYCHOLOGICAL DESTRUCTION SCALES: ADAPTATION AND VALIDATION OF RUSSIAN VERSION

Aidos K. Bolatov[1,2]**,** https://orcid.org/0000-0002-5390-4623

Meiramgul D. Zhorokpayeva[3]**,** https://orcid.org/0000-0001-9101-654X

Dariga S. Smailova[4]**,** https://orcid.org/0000-0002-7152-7104

Akhat D. Amanzholov[3]**,** https://orcid.org/0000-0002-5393-4187

[1] **NCJSC «Astana Medical University», Nur-Sultan, Republic of Kazakhstan;**
[2] **CF « University Medical Center», Nur-Sultan, Republic of Kazakhstan;**
[3] **NCJSC «Semey Medical University», Semey, Republic of Kazakhstan;**
[4] **Kazakhstan's Medical University «Kazakhstan School of Public Health», Almaty, Republic of Kazakhstan.**

Abstract

Background: The available evidence suggests a negative impact of the COVID-19 pandemic on mental health. Scientists and doctors from all over the world are sounding the alarm about the need to study and assess the mental health of those affected by the pandemic in order to take appropriate and timely measures. In turn, for a correct assessment of the mental state, it is necessary to use validated scales.

Objective: We aim to assess the validity of Impact of the COVID-19 pandemic on quality of life (COV19-QoL) and COVID-19 psychological destruction scales (COVID-19 PDS) adapted to Russian among the medical students.

Materials and methods: A cross-sectional study was carried out among 273 1-year medical students at Astana Medical University (Kazakhstan) in November, 2020. Statistical analyses included descriptive analysis, internal consistency and concurrent validity, exploratory and confirmatory factor analysis (CFA).

Results: The Cronbach's alpha coefficient of the COVID-19 PDS was 0.919, and 0.898 for COV19-QoL scale. All item-total correlations for both scales were positive (range 0.316-0.832), the Barlett's sphericity test result was significant ($p < 0.001$), and the KMO measure of sampling adequacy exceeded 0.899. The EFA yielded a 2 and 1-factor structure of the COVID-19 PDS and COV19-QoL scale, respectively, which was confirmed by a CFA with acceptable fit indices. Concurrent validity was confirmed by a significant correlation with Mental Health Continuum-Short Form.

Conclusion: The Russian version of the COVID-19 PDS and COV19-QoL scales were shown to have adequate validity and reliability. It may be a useful tool to measure psychological impact of the COVID-19 pandemic.

Key words: *COVID-19, pandemic, quality of life, psychological destruction, scale, validation*

Резюме

ПСИХОЛОГИЧЕСКОЕ ДАВЛЕНИЕ И ВЛИЯНИЕ ПАНДЕМИИ COVID-19 НА КАЧЕСТВО ЖИЗНИ: АДАПТАЦИЯ И ВАЛИДИЗАЦИЯ РУССКОЯЗЫЧНОЙ ВЕРСИИ ШКАЛ

Айдос Болатов[1,2]**,** https://orcid.org/0000-0002-5390-4623

Мейрамгуль Д. Жорокпаева[3]**,** https://orcid.org/0000-0001-9101-654X

Дарига С. Смаилова[4]**,** https://orcid.org/0000-0002-7152-7104

Ахат Д. Аманжолов[3]**,** https://orcid.org/0000-0002-5393-4187

[1] **НАО «Медицинский университет Астана», г. Нур-Султан, Республика Казахстан;**
[2] **КФ «University Medical Center», г. Нур-Султан, Республика Казахстан;**
[3] **НАО «Медицинский университет Семей», г. Семей, Республика Казахстан;**
[4] **Казахстанский медицинский университет «Высшая школа общественного здравоохранения»,
г. Алматы, Республика Казахстан.**

Актуальность. Имеющиеся данные свидетельствуют о негативном влиянии пандемии COVID-19 на психическое здоровье. Ученые и врачи всего мира бьют тревогу о необходимости изучения и оценки психического здоровья пострадавших от пандемии для принятия адекватных и своевременных мер. В свою очередь, для правильной оценки психического состояния необходимо использовать валидизтрованные шкалы.

Цель: Оценить валидность адаптированных на русский язык шкал влияния пандемии COVID-19 на качество жизни (COV19-QoL) и психологического давления COVID-19 (COVID-19 PDS) среди студентов-медиков.

Материалы и методы. Проведено поперечное исследование среди 273 студентов 1 курса Медицинского университета Астана (Казахстан) в ноябре 2020 года. Статистический анализ включал описательный анализ,

измерение внутренней согласованности и конкурентной валидности, исследовательский (EFA) и подтверждающий факторный анализ (CFA).

Результаты. Коэффициент альфа Кронбаха для COVID-19 PDS составил 0,919 и 0,898 для шкалы COV19-QoL. Все корреляции между пунктами и итоговым значением для обеих шкал были положительными (диапазон 0,316-0,832), результат теста сферичности Барлетта был значимым (p < 0,001), а показатель адекватности выборки KMO превысил 0,899. EFA выявила 2- и 1-факторные структуры шкалы COVID-19 PDS и COV19-QoL соответственно, что было подтверждено CFA с приемлемыми индексами соответствия. Конкурентная валидность была подтверждена значительной корреляцией с краткой формой шкалы континуума психического здоровья.

Заключение. Русскоязычная версия шкал COVID-19 PDS и COV19-QoL показала достаточную валидность и надежность. Данные шкалы могут быть полезным инструментом для измерения психологического воздействия пандемии COVID-19.

Ключевые слова: COVID-19, pandemic, quality of life, psychological destruction, scale, validation

Түйіндеме

COVID-19 ПАНДЕМИЯСЫНЫҢ ӨМІР САПАСЫНА ӘСЕРІ ЖӘНЕ ПСИХОЛОГИЯЛЫҚ ҚЫСЫМЫ: ШКАЛАЛАРДЫҢ ОРСЫТІЛДІ НҰСҚАЛАРЫН АДАПТАЦИЯЛАУ ЖӘНЕ СЕНІМДІЛІГІН РАСТАУ

Айдос Болатов[1,2], https://orcid.org/0000-0002-5390-4623

Мейрамгуль Д. Жорокпаева[3], https://orcid.org/0000-0001-9101-654X

Дарига С. Смаилова[4], https://orcid.org/0000-0002-7152-7104

Ахат Д. Аманжолов[3], https://orcid.org/0000-0002-5393-4187

[1] "Астана медицина университеті" КеАҚ, Нұр-Сұлтан қ., Қазақстан Республикасы;
[2] "University Medical Center" КҚ, Нұр-Сұлтан қ., Қазақстан Республикасы;
[3] "Семей медицина университеті" КеАҚ, Семей қ., Қазақстан Республикасы;
[4] Қазақстандық медицина университеті «Қоғамдық денсаулық сақтау жоғары мектебі», Алматы қ., Қазақстан Республикасы.

Өзектілігі: Қолда бар дәлелдер COVID-19 пандемиясының психикалық денсаулыққа кері әсерін көрсетеді. Дүние жүзінің ғалымдары мен дәрігерлері адекватты және дер кезінде шаралар қабылдау үшін пандемиядан зардап шеккендердің психикалық денсаулығын зерттеу және бағалау қажеттілігі туралы дабыл қағуда. Өз кезегінде, психикалық жағдайды дұрыс бағалау үшін валидацияланған шкалаларды қолдану қажет.

Мақсаты: COVID-19 пандемиясының өмір сапасына әсері (COV19-QoL) және COVID-19 пандемиясының психологиялық қысымын (COVID-19 PDS) бағалайтын орыс тіліне бейімделген шкалалардың медицина студенттері арасында сенімділігін бағалау.

Материалдар мен тәсілдер: 2020 жылдың қараша айында Астана медицина университетінің (Қазақстан) 1 курс 273 студенті арасында көлденең зерттеу жүргізілді. Статистикалық талдауға сипаттамалық талдау, ішкі сәйкестік пен конкуренттік сенімділігін анықтау, барлау (EFA) және растаушы факторлық талдау (CFA) кірді.

Нәтижелер: COVID-19 PDS және COV19-QoL шкаласы үшін Кронбахтың альфа коэффиценті сәйкесінше 0,919 және 0,898 болды. Екі шкала бойынша элементтер мен нәтиже арасындағы барлық корреляция он болды (диапазон 0,316-0,832), Барлеттің сфералық сынағы нәтижесі маңызды болды (p <0,001) және KMO көрсеткіші 0,899-дан жоғары болды. EFA сәйкес келетін сәйкестік көрсеткіштері мен CFA арқылы расталған COVID-19 PDS және COV19-QoL көрсеткіштерінің 2 және 1 факторлы құрылымдары анықталды. Конкуренттік сенімділігі психикалық денсаулық континуумының қысқа нұсқалы шкаласымен маңызды корреляциясымен расталды.

Қорытынды: COVID-19 PDS және COV19-QoL шкалаларының орыс тіліндегі нұсқасы жеткілікті жарамдылық пен сенімділікті көрсетті. Бұл COVID-19 пандемиясының психологиялық әсерін өлшеудің пайдалы құралдары болуы мүмкін.

Түйінді сөздер: COVID-19, пандемия, өмір сапасы, психологиялық қысым, мастаб, валидация.

Introduction

Relating to the worldwide spread of the novel coronavirus (COVID-19 pandemic) and the resulting restrictive measures, the mental health of the population is under threat [20,26]. As reported, the COVID-19 pandemic showed a traumatic impact on the psychological functioning of the public and associated with high levels of psychological distress [8,18]. Moreover, according to Lee (2020) COVID-19 related mental health concerns have not been adequately addressed [23]. In this context, identifying mental health issues associated with COVID-19 using valid psychometric tools can help the healthcare system to carefully deal with the psychological consequences of COVID-19 and provide effective strategies to protect public health [9,25,32]. Thus, well-adapted scales can contribute to health policy development processes and help explore the effectiveness of interventions, both to expand their evidence base and to further their application in possible global crises like a pandemic [11,38].

There are several scales that can measure various psychological conditions associated with the COVID-19 pandemic: stress [28,35], distress [15,22], anxiety [10,14,24], fear [1,36], phobia [18], obsession [4], perception and attitudes towards the response to COVID-19 [5,21,29]. At the same time, there are few scales that have been adapted into Russian or Kazakh, moreover, validated for the Kazakhstani population. Some measures/scales have been used among the population of Kazakhstan in the framework of various international and cross-cultural studies: perceived risk of infection [33], perceived health and economic risks [27], health-related anxiety, COVID-19

risk factors [19], loneliness [37], and fear of COVID-19 [31]. However, most of the above scales reveal issues of social psychology in the context of a pandemic. Previously, Bolatov et al. (2021) used scale to measure fear of COVID-19 adapted from Snell's questionnaire regarding fear of AIDS [7] among medical students.

Given the lack of reliable scales that could assess the psychological consequences of the COVID-19 pandemic, in this manuscript, the authors aimed to assess the validity of the "COVID-19 Psychological Destruction" and "The COV-19 – Impact on Quality of Life" scales, created by Akan (2020) [2] and Repišti et al. (2020) [30], respectively.

Materials and Methods

Participants **and study design**

A questionnaire-based cross-sectional study was conducted among 1-year medical students at Astana Medical University, Kazakhstan, in November, 2020.

Measures

The questionnaire included:

• Socio-demographic characteristics (gender and age).

• COVID-19 Psychological Destruction Scale was used to determine the level of destruction that COVID-19 caused on the psychology of individuals [2]. The Russian version of the COVID-19 PDS (Table 1) consists of 18 questions presented in two categories: fear of COVID-19 - 4 questions, and psychological collapse associated with COVID-19 - 14 questions. The response categories and their scores were: "never (1)", "rarely (2)", "sometimes (3)", "often (4)", and "always (5)". For each subscale and the scale as a whole, a total score was calculated.

Table 1.

The Russian version of the COVID-19 Psychological Destruction Scale. Corrected item-total correlation and Cronbach's alpha internal consistency.

№	Item	Corrected item-total correlation	Cronbach's α if item deleted
Следующие вопросы касаются Вашего отношения к пандемии COVID-19. *«Как часто Вы испытывали следующие состояния с начала пандемии COVID-19?».* Категории ответов и их оценка: «Никогда» (1), «Редко» (2), «Иногда» (3), «Часто» (4) и «Постоянно» (5).		
	Subscale "Fear"		
1	Я боюсь заболеть	0.387	0.925
2	Если я заболею, я беспокоюсь о том, что со мной будет	0.346	0.926
3	Мысль о том, «а что, если я заболел(а)?» беспокоит меня	0.427	0.924
4	Я выясняю, есть ли у меня симптомы заболевания	0.316	0.927
	Subscale "Psychological Collapse"		
5	Я чувствую себя очень усталым(ой) в период пандемии	0.612	0.920
6	Я чувствую себя беспокойным(ой), нервным(ой) и подавленным(ой) в период пандемии	0.700	0.918
7	Я не хочу ничего делать во время пандемии	0.645	0.919
8	У меня проблемы во взаимоотношениях с людьми вокруг меня в период COVID-19	0.665	0.919
9	Мне трудно что-то начинать, как наступила пандемия	0.664	0.919
10	Что бы я ни делал(а), я не могу расслабиться	0.700	0.918
11	Я стал(а) быстрее становиться грустным(ой) и плакать	0.684	0.918
12	У меня недостаточно энергии, чтобы справиться с проблемами в период пандемии	0.747	0.916
13	Мне даже трудно выполнять свой привычный распорядок дня из-за пандемии	0.735	0.917
14	Я чувствую, что не могу преодолеть жизненные трудности в период пандемии	0.743	0.917
15	Моя радость жизни уменьшалась день ото дня с момента начала пандемии	0.676	0.918
16	Я думаю, что не забочусь о себе сильно по сравнению с прошлым	0.680	0.918
17	Я чувствую, что жизнь в период вспышки COVID-19 бессмысленна.	0.547	0.921
18	Мне трудно переносить стресс, вызванный неуверенностью в завтрашнем дне	0.700	0.918

• The COV-19 – Impact on Quality of Life Scale was used to assess the impact of the COVID-19 pandemic on quality of life [30]. The Russian version of COV19-QoL (Table 2) consists of 6 questions. All questions included a 5-point Likert scale (ranging from 1 - "strongly disagree" to 5 - "strongly agree") and assessed the period of the last 7 days. The total scores are calculated by averaging the scores for all items. A higher score indicates a greater perceived impact of the pandemic on quality of life.

Table 2.

The Russian version of the COV-19 – Impact on Quality of Life Scale. Corrected item-total correlation and Cronbach's alpha internal consistency.

№	Item	Corrected item-total correlation	Cronbach's α if item deleted
«Ответьте, пожалуйста, на следующие вопросы, отмечая, как часто Вы испытываете те или иные чувства в течение последних 7 дней. Из-за распространения коронавирусной инфекции…». Категории ответов и их оценка: от (1) - «Категорически не согласен» до (5) - «Полностью согласен».			
1	... Я думаю, что качество моей жизни стало ниже, чем раньше	0.652	0.893
2	... Я думаю, что мое психическое здоровье ухудшилось	0.819	0.867
3	... Я думаю, что мое физическое здоровье может ухудшиться	0.688	0.888
4	... Я чувствую себя более напряженным, чем раньше	0.814	0.867
5	... Я чувствую себя более подавленным, чем раньше	0.792	0.871
6	... Я чувствую, что моя личная безопасность находится под угрозой	0.603	0.899

Procedures and Statistical analysis

COVID-19 PDS and COV19-QoL scales were converted into the Russian language from the original English version using a forward-backward translation process performed by specialists in the field of psychology and language.

Internal consistency was evaluated by the total scale and subscales reliability analysis reflected by Cronbach's alpha coefficient. A Cronbach's alpha coefficient with a value of ≥ 0.7 is acceptable [34]. Corrected item-total correlation was carried out.

Construct validity was established by the confirmatory factor analysis (CFA) technique, with Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy used to test the dataset for factor analysis suitability. Extraction of factors using exploratory factor analysis (EFA) was carried out to determine the number of factors with cutoff scores of item/factor loading >0.3 [13]. The CFA is used to assess the overall goodness of fit: the Root Mean Square of Error Approximation RMSEA (< 0.08); the Comparative Fit Index CFI (> 0.9); and the Tucker-Lewis Index TLI (> 0.9) [40].

Since both scales evaluate the impact of the COVID-19 pandemic on psychological well-being, the validity of the criteria was assessed by the correlation between them.

Descriptive statistics were performed using mean (M), standard deviation (SD) for quantitative variables, and percentages for qualitative variables. T-test was performed to compare the effect of different variables and to assess the change in various parameters of the study groups. Pearson's correlation were performed to evaluate associations of the independent variables.

The study was approved by the Local Ethics Committee of NpJSC "Astana Medical University" (extract from protocol No. 6 of April 6, 2020).

Ethics statement

The study was approved by the Local Ethics Committee of Astana Medical University (extract from protocol No. 6 of April 6, 2020).

Results and Discussion

The study involved 273 students aged 16 to 23 years, the average age was 17.4 years. Distribution of respondents by gender: male participants – 70 (25.6%), female – 203 (74.4%).

COVID-19 PDS

The overall Cronbach alpha coefficient of the COVID-19 PDS was 0.919 (0.783 for Fear of COVID-19 and 0.933 for Psychological Collapse subscale), indicating a high level of internal consistency. The correlation of the adjusted each item to the overall scale had values in the range (0.316–0.747), with a minimum allowable value of 0.3. Bartlett's test of sphericity, indicating the homogeneity of the variance, was significant ($p < 0.001$), and the KMO sample adequacy index exceeded 0.906.

EFA analysis identified a two-factor model that corresponded to the original scale [2]. The loading of factors was in the range of 0.433-0.826 (>0.3). The initial eigenvalues of the factors were equal to 7.43 for Factor 1 (items 1-4) and 1.39 for Factor 2 (items 5-18) (>1.0 [17]). In this case, Factor 1 account for 41.28% of the total variance [39]. Comparative fit indices of one- and two-factor models are presented in Table 3. Thus, the two-factor model of the COVID-19 PDS was confirmed in this study.

Table 3.

Fit Indices for Confirmatory Factor Models for COVID-19 PDS.

Models	χ2/df	CFI	TLI	RMSEA	p
One-factor model	4.87	0.773	0.743	0.128	< 0.001
Two-factor model	3.06	0.880	0.867	0.0926	< 0.001

COV19-QoL

The Cronbach's alpha coefficient of COV19-QoL was 0.898, indicating a high level of internal consistency. The correlation of each item adjusted to the overall scale was in the range (0.632–0.832). Bartlett's test was significant (p < 0.001), and the KMO sample adequacy index exceeded 0.899. EFA analysis reviled a one-factor model appropriate to the original scale [30]. According to the CFA analysis, the compliance of the model with the COV19-QoL scale was confirmed by the following indices: $\chi 2/df = 1.378$; RMSEA = 0.0526; CFI = 0.993; TLI = 0.988.

Correlation analysis between the COV19-QoL and COVID-19 PDS scales showed a significant positive correlation between these two indicators (r = 0.717, p <0.01). Moreover, significant correlation of COV19-QoL and COVID-19 PDS with Mental Health Continuum-Short Form

assessed in previous study indicates concurrent validity of both scales [6].

Socio-demographic characteristics of COVID-19 PDS and COV19-QoL

Table 4 demonstrates some socio-demographic characteristics distribution in the level of COVID-19 PDS and COV19-QoL. The levels of psychological destruction caused by the pandemic and the quality of life during the pandemic did not differ by gender. However, current literature shows that female group has higher levels of negative emotions [16], women mental health was more impacted by a pandemic [12]. The absence of gender differences in the scale values can be explained by the fact that during the study period, students studied online and were at home in relatively the same conditions.

Table 4.

Socio-demographic characteristics of COVID-19 PDS and COV19-QoL

Characteristics		*COVID-19 PDS*		*COV19-QoL*	
		M (SD)	t-test, p	M (SD)	t-test, p
Gender	Male	43.12 (17.86)	1.459, 0.146	2.31 (1.2)	0.396, 0.693
	Female	39.70 (14.84)		2.38 (1.15)	
Education payment form	Grant	40.49 (14.99)	0.137, 0.891	2.40 (1.14)	0.894, 0.372
	Paid	40.82 (17.91)		2.24 (1.22)	
Family members are HCW	No	40.05 (15.54)	1.175, 0.241	2.00 (1.15)	0.868, 0.387
	Yes	43.35 (16.45)		2.33 (1.25)	

Note: COVID-19 DPS - COVID-19 Psychological Destruction Scale; COV19-QoL - COVID-19 – Impact on Quality of Life Scale

It was also assumed that those participants whose close relatives were health care workers would show a greater negative impact of the pandemic on psychological well-being. However, the data obtained indicate the absence of any differences in this factor. This can be explained by the small sample size and the lack of study of other factors potentially associated with mental health.

Conclusion

Thus, we have proved the validity of the Russian-language version of the COVID-19 PDS and COV19-QoL scales. While further research is pending in other populations, these scales are valid instruments to assess the psychological state and quality of life of people during global catastrophes, such as the COVID-19 pandemic. In turn, a correct assessment of mental health will allow the state and the health care system to take appropriate measures to avoid negative consequences in the psychological well-being of the population.

References:

1. *Ahorsu D.K., Lin C.Y., Imani V., Saffari M., Griffiths M.D., Pakpour A.H.* The Fear of COVID-19 Scale: Development and Initial Validation // International journal of mental health and addiction, 2020. 1–9. Advance online publication. https://doi.org/10.1007/s11469-020-00270-8

2. *Akan Y.* Development of the "COVID-19 Psychological Destruction Scale" // A Validity and Reliability Study. 2020. https://doi.org/10.21203/rs.3.rs-46890/v1

3. *Arpaci I., Karataş K., Baloğlu M.* The development and initial tests for the psychometric properties of the COVID-19 Phobia Scale (C19P-S) // Personality and individual differences, 2020. 164, 110108. https://doi.org/10.1016/j.paid.2020.110108

4. *Ashraf F., Lee S. A., Elizabeth Crunk A.* Factorial validity of the Urdu version of the Obsession with COVID-19 Scale: Preliminary investigation using a university sample in Pakistan // Death studies, 2020. 1–6. Advance online publication.
https://doi.org/10.1080/07481187.2020.1779436

5. *Ben Abdelaziz A., Benzarti S., Nouira S., Mlouki I., Achouri M.Y., Ben Abdelaziz I., Yahia F., Barhoumi T., Soulimane A.* Attitudes of health professionals towards the response to the COVID-19 pandemic in Maghreb. La Tunisie medicale, 2020. 98(5), 324–333.

6. *Bolatov A.K., Gabbasova A.M., Baikanova R.K., Igenbayeva B.B., Pavalkis D.* Online or Blended Learning: the COVID-19 Pandemic and First-Year Medical Students' Academic Motivation // Medical Science Educator, 2022. 32(1), 221–228. https://doi.org/10.1007/s40670-021-01464-y

7. *Bolatov A.K., Seisembekov T.Z., Askarova A.Z., Baikanova R.K., Smailova D.S., Fabbro E.* Online-Learning

due to COVID-19 Improved Mental Health Among Medical Students // Medical Science Educator, 2021. 31(1), 183–192. https://doi.org/10.1007/s40670-020-01165-y

8. *Chamaa F., Bahmad H.F., Darwish B., Kobeissi J.M., Hoballah M., Nassif S.B., Ghandour Y., Saliba J.P., Lawand N., Abou-Kheir W.* PTSD in the COVID-19 Era // Current neuropharmacology, 2021. 19(12), 2164–2179. https://doi.org/10.2174/1570159X19666210113152954

9. *Chandu V.C., Marella Y., Panga G.S., Pachava S., Vadapalli V.* Measuring the Impact of COVID-19 on Mental Health: A Scoping Review of the Existing Scales // Indian journal of psychological medicine, 2020.4 2(5), 421–427. https://doi.org/10.1177/0253717620946439

10. *Chandu V.C., Pachava S., Vadapalli V., Marella Y.* Development and Initial Validation of the COVID-19 Anxiety Scale // Indian journal of public health, 64 (Supplement), 2020. S201–S204. https://doi.org/10.4103/ijph.IJPH_492_20

11. *Cortez P.A., Joseph S.J., Das N., Bhandari S.S., Shoib S.* Tools to measure the psychological impact of the COVID-19 pandemic: What do we have in the platter? // Asian journal of psychiatry, 2020. 53, 102371. https://doi.org/10.1016/j.ajp.2020.102371

12. *Del Río-Casanova L., Sánchez-Martín M., García-Dantas A., González-Vázquez A., Justo A.* Psychological responses according to gender during the early stage of covid-19 in Spain // International Journal of Environmental Research and Public Health, 2021. 18(7). https://doi.org/10.3390/ijerph18073731

13. *DeVellis R.F.* Scale development: theory and applications. 2nd ed. Thousand Oaks (CA): SAGE Publications, Inc; 2003.

14. *Evren C., Evren B., Dalbudak E., Topcu M., Kutlu N.* Measuring anxiety related to COVID-19: A Turkish validation study of the Coronavirus Anxiety Scale. Death studies, 2020. 1–7. Advance online publication. https://doi.org/10.1080/07481187.2020.1774969

15. *Feng L.S., Dong Z.J., Yan R.Y., Wu X.Q., Zhang L., Ma J., Zeng Y.* Psychological distress in the shadow of the COVID-19 pandemic: Preliminary development of an assessment scale // Psychiatry research, 2020. 291, 113202. https://doi.org/10.1016/j.psychres.2020.113202

16. *Fenollar-Cortés J., Jiménez Ó., Ruiz-García A., Resurrección D.M.* Gender Differences in Psychological Impact of the Confinement During the COVID-19 Outbreak in Spain: A Longitudinal Study // Frontiers in Psychology, 2021. 12. https://doi.org/10.3389/fpsyg.2021.682860

17. *Finch W.H.* Using Fit Statistic Differences to Determine the Optimal Number of Factors to Retain in an Exploratory Factor Analysis // Educational and psychological measurement, 2020. 80(2), 217–241. https://doi.org/10.1177/0013164419865769

18. *French M.T., Mortensen K., Timming A.R.* Psychological Distress and Coronavirus Fears During the Initial Phase of the COVID-19 Pandemic in the United States // The journal of mental health policy and economics, 2020. 23(3), 93–100.

19. *Frenzel S.B., Junker N.M., Avanzi L., Bolatov A., Haslam S.A., Häusser J.A. et al.* A trouble shared is a trouble halved: The role of family identification and identification with humankind in well-being during the COVID-19 pandemic // The British journal of social psychology, 2022. 61(1), 55–82. https://doi.org/10.1111/bjso.12470

20. *García-Iglesias J.J., Gómez-Salgado J., Martín-Pereira J., et al.* Impacto del SARS-CoV-2 (Covid-19) en la salud mental de los profesionales sanitarios: una revisión sistemática [Impact of SARS-CoV-2 (Covid-19) on the mental health of healthcare professionals: a systematic review] // Revista espanola de salud publica, 2020. 94, e202007088.

21. *González-Olmo M.J., Ortega-Martínez A.R., Delgado-Ramos B., Romero-Maroto M., Carrillo-Diaz M.* Perceived vulnerability to Coronavirus infection: impact on dental practice // Brazilian oral research, 2020. 34, e044. https://doi.org/10.1590/1807-3107bor-2020.vol34.0044

22. *Jahanshahi A.A., Dinani M.M., Madavani A.N., Li J., Zhang S.X.* The distress of Iranian adults during the Covid-19 pandemic - More distressed than the Chinese and with different predictors // Brain, behavior, and immunity, 2020. 87, 124–125. https://doi.org/10.1016/j.bbi.2020.04.081

23. *Lee S.A.* Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety // Death studies, 2020. 44(7), 393–401. https://doi.org/10.1080/07481187.2020.1748481

24. *Lee S.A., Mathis A.A., Jobe M.C., Pappalardo E.A.* Clinically significant fear and anxiety of COVID-19: A psychometric examination of the Coronavirus Anxiety Scale // Psychiatry research, 2020. 290, 113112. https://doi.org/10.1016/j.psychres.2020.113112

25. *Legido-Quigley H., Asgari N., Teo Y.Y., Leung G.M., Oshitani H., Fukuda K., Cook A. R., Hsu L. Y., Shibuya K., Heymann D.* Are high-performing health systems resilient against the COVID-19 epidemic? // Lancet (London, England), 2020. 395(10227), 848–850. https://doi.org/10.1016/S0140-6736(20)30551-1

26. *Majeed S., Schwaiger E.M., Nazim A., Samuel I.S.* The Psychological Impact of COVID-19 Among Pakistani Adults in Lahore // Frontiers in public health, 2021. 9, 578366. https://doi.org/10.3389/fpubh.2021.578366

27. *Nisa C.F., Bélanger J.J., Faller D.G., Buttrick N.R., Mierau J.O., Austin M., Schumpe B.M. et al.* Lives versus Livelihoods? Perceived economic risk has a stronger association with support for COVID-19 preventive measures than perceived health risk // Scientific reports, 2021. 11(1), 9669. https://doi.org/10.1038/s41598-021-88314-4

28. *Pedrozo-Pupo J.C., Pedrozo-Cortés M.J., Campo-Arias A.* Perceived stress associated with COVID-19 epidemic in Colombia: an online survey // Cadernos de saude publica, 2020. 36(5), e00090520. https://doi.org/10.1590/0102-311x00090520

29. *Pérez-Fuentes M., Molero Jurado M., Oropesa Ruiz N.F., Martos Martínez Á., Simón Márquez M., Herrera-Peco I., Gázquez Linares J.J.* Questionnaire on Perception of Threat from COVID-19 // Journal of clinical medicine, 2020. 9(4), 1196. https://doi.org/10.3390/jcm9041196

30. *Repišti S., Jovanović N., Kuzman M., Medved S., Jerotić S., Ribić E., Majstorović T., et al.* 2020.How to measure the impact of the COVID-19 pandemic on quality of life: COV19-QoL – the development, reliability and validity of a new scale // Global Psychiatry,0(0) -. https://doi.org/10.2478/gp-2020-0016

31. *Sawicki A.J., Żemojtel-Piotrowska M., Balcerowska J.M. et al.* The fear of COVID-19 scale: Its structure and

measurement invariance across 48 countries // Psychological assessment, 2022. 10.1037/pas0001102. Advance online publication. https://doi.org/10.1037/pas0001102

32. *Shamasunder S., Holmes S.M., Goronga T., Carrasco H., Katz E., Frankfurter R., Keshavjee S.* COVID-19 reveals weak health systems by design: Why we must re-make global health in this historic moment // Global public health, 2020. 15(7), 1083–1089. https://doi.org/10.1080/17441692.2020.1760915

33. *Stroebe W., vanDellen M.R., Abakoumkin G., Lemay E.P., Schiavone W.M., Agostini M., Bélanger J.J., Gützkow B., et al.* Politicization of COVID-19 health-protective behaviors in the United States: Longitudinal and cross-national evidence // PloS one, 2021. 16(10), e0256740. https://doi.org/10.1371/journal.pone.0256740

34. *Taber K.S.* The use of Cronbach's alpha when developing and reporting research instruments in science education. Research in Science Education, 2018. 48(6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2

35. *Taylor S., Landry C.A., Paluszek M.M., Fergus T.A., McKay D., Asmundson G.* Development and initial validation of the COVID Stress Scales // Journal of anxiety disorders, 2020. 72, 102232. https://doi.org/10.1016/j.janxdis.2020.102232

36. *Tzur Bitan D., Grossman-Giron A., Bloch Y., Mayer Y., Shiffman N., Mendlovic S.* Fear of COVID-19 scale: Psychometric characteristics, reliability and validity in the Israeli population // Psychiatry research, 2020. 289, 113100. https://doi.org/10.1016/j.psychres.2020.113100

37. *van Breen J.A., Kutlaca M., Koç Y., Jeronimus B.F., Reitsema A.M., Jovanović V., et al.* Lockdown Lives: A Longitudinal Study of Inter-Relationships Among Feelings of Loneliness, Social Contacts, and Solidarity During the COVID-19 Lockdown in Early 2020 // Personality & social psychology bulletin, 2021. 1461672211036602. Advance online publication. https://doi.org/10.1177/01461672211036602

38. *Voitsidis P., Kerasidou M.D., Nikopoulou A.V., Tsalikidis P., Parlapani E. et al.* A systematic review of questionnaires assessing the psychological impact of COVID-19 // Psychiatry research, 2021. 305, 114183. https://doi.org/10.1016/j.psychres.2021.114183

39. *Watkins M.W.* Exploratory Factor Analysis: A Guide to Best Practice // Journal of Black Psychology, 2018. 44(3), 219–246. https://doi.org/10.1177/0095798418771807

40. *Xia Y., Yang Y.* RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods // Behavior Research Methods, 2019. 51(1), 409–428. https://doi.org/10.3758/s13428-018-1055-2

Контактная информация:
Болатов Айдос Канатович, MD, преподаватель кафедры общей и биологической химии НАО «Медицинский университет Астана», г. Нур-Султан, Республика Казахстан.
Почтовый адрес: Z10K9D9, Республика Казахстан, г. Нур-Султан, ул. Бейбитшилик 49а.
E-mail: bolatovaidos@gmail.com
Телефон: 87776000096