Original scientific paper

Received: May, 06.2022.
Revised: July, 11.2022.
Accepted: July, 17.2022.

UDK:
364.624.6-057.874:[616.98:578.834(571:575.2)
159.944.4.072-057.874
doi: 10.23947/2334-8496-2022-10-2-27-37

The Cross-Cultural Differences in Perceived Stress of the COVID-19 Pandemic in Schoolchildren from Russia and Kyrgyzstan With Normal and High Levels of Anxiety and Depression

Maria A. Sitnikova[1*, 4], *Proshina Ekaterina*[2], *Deviaterikova Alena*[3], *Malykh Sergey*[4], *Moiseeva Oksana*[1], *Ananieva Marina*[1]

[1]Research and Project Centre for Cognitive Neuroscience and Neurotechnologies, Belgorod National Research University: Belgorod, Russia, e-mail: sitnikovamary46@gmail.com, oksana14.08.1317@gmail.com, rudofilova.marina@yandex.ru
[2]Laboratory of Psychophysiology of Individual Differences, Scientific Research Institute of Neurosciences and Medicine, Novosibirsk, Russia, e-mail: proshinaea@physiol.ru
[3]Research Institute for Brain Development and Peak Performance, Peoples' Friendship University of Russia, Moscow, Russia, e-mail: alena.deviaterikova@gmail.com
[4]Centre for Interdisciplinary Research in Education, Russian Academy of Education, Moscow, Russia, e-mail: malykhsb@mail.ru

Abstract: Children and youth of school age form a special population group highly sensitive to various stressors and negative effects in everyday life. The COVID-19 pandemic crisis characterized by uncertainty, vulnerability, changes in quality of life together with urgent transition to distant/online learning affected significantly psychological well-being of children and youth. The aim of this study was to assess the cross-cultural differences in actual stress in Russian and Kyrgyz schoolchildren with high and low levels of anxiety and depression during the initial stage of the COVID-19 pandemic and after a year life during the pandemic. The descriptive cross-sectional study was conducted via an online survey completed by total 1834 schoolchildren aged from 13 to 18 from Russia and Kyrgyzstan, the periods of survey: 10th May - 10th June, 2020; 18th May -15th June, 2021. The Perceived Stress Scale and Hospital Anxiety and Depression Scale were used to assess stress, anxiety and depression scores. The findings suggest that there are cross-cultural differences in perceived stress amongst schoolchildren with high level of depression and anxiety: Russian respondents in 2021 demonstrated less pronounced index of the perceived stress than Kyrgyz schoolchildren. The stress level of Kyrgyz schoolchildren increased significantly in 2021 in comparison to the period of outbreak of the pandemic. In 2021 in both countries we found the same pattern: girls had significantly more pronounced stress than boys. The results disclose important aspects of the impact of COVID-19 on schoolchildren and demonstrate the emerging need of psychological aid and for supporting schoolchildren mental health.

Keywords: COVID-19 pandemic, psychological outcomes, stress, anxiety, depression, schoolchildren.

Introduction

The COVID-19 pandemic has proven to become a global stressful situation for the whole world. As a result, fundamental changes took place in people's daily lives - some people lost their jobs, some had to adapt to new, remote working conditions, home confinement, lockdowns, social distancing, constant fear of infection (Salari, et al., 2020). However, the psychological impact of the COVID-19 pandemic is much more serious than the somatic consequences of the infection (Espinola, et al., 2016). The COVID-19 pandemic led to psychological difficulties that occurred not only in those who were infected and recovered, but also in many people who were not directly affected.

From a psychological point of view, the majority of people feel uncertainty, unpredictability, confusion on the one hand, and at the same time the importance of what is happening, on the other hand. The emergence and development of pandemics usually affect the entire population of the planet

*Corresponding author: sitnikovamary46@gmail.com

and lead to impairment of the psychological well-being of people. Prolonged home confinement, lack of direct interpersonal communication, lack of physical and social activities, disappointment and boredom from the monotony of the quarantine lifestyle are among the aggravating factors in formatting of adverse psychological consequences. Therefore, among most typical psychological responses towards worldwide epidemics and pandemics are worries, anxiety, distress, depression, nonspecific and unguided fears (Taylor, 2019). During the COVID-19 pandemic social and physical distancing as well as quarantine were imposed by the government due to unknown course of the disease and high risk of mass spread of poorly understood infection, lack of proven treatment and prevention measures, that escalated the distress caused by a pandemic (Maunder, et al., 2006; Shanahan, et al., 2022), and could lead to many immediate and long-term negative socio-economical and psychological consequences for people (Meledandri and Trimarco, 2021).

Psychological well-being and mental health of individuals are mostly impaired during pandemics, including the COVID-19 pandemic (Pfefferbaum and North, 2020; Basheti, Mhaidat and Mhaidat, 2021). According to the research findings during previous pandemics (Matsuishi, et al., 2012; Bukhari, et al., 2016) increased levels of stress, anxiety, depression and traumatic stress often happened among individuals all over the world. In many studies on the outcomes of the initial period of the COVID-19 pandemic in winter-spring of 2020 they have reported the mentioned above negative psychological states as well as post-traumatic stress, anger, insomnia, confusion, grief and numbness in various samples of population (Tull, et al., 2020; Cao, et al., 2020; Xiang, et al., 2020; Kang, et.al., 2020; Wang C., et al., 2020; Mazza, et al., 2020; Hyland, et al., 2020). All these reactions hindered adaptation to the new social and environmental requirements.

Up to now the pandemic has been going on for more than two years already, many people learned to adapt to the situation of pandemic. At the initial stage of the COVID-19 pandemic the stressful events were uncontrollable, unpredictable, overloading and exceeding the capacity to adapt, they affect greatly people's everyday life. With a progress of the pandemic, more and more people adapted to the stress of COVID-19, as an adaptation to stress is a manifestation of general mental health. The findings of some studies, revealing that the level of stress in 2021 if compared to 2020 was lower, proved it (Lupe, Keefer and Szigethy, 2020). On the opposite, a maladaptation to stress can lead to the development of sustainable depressive and anxiety symptoms (Muratori and Ciacchini, 2020). Moreover, adaptation to a pandemic may have a gender aspect: females have more difficulties associated with internalization, and males with externalization (Lohaus, et al., 2004).

Children and youngsters are vulnerable to various kinds of psychological and social negative impacts due to their personal immaturity and emotional instability. They could either underestimate or greatly overestimate threats and risks of the coronavirus pandemic. Stressors such as monotony of homestay lifestyle, frustration, lack of face-to-face communication with classmates, friends and teachers, lack of personal space at home, and family financial losses during quarantine could cause long-term adverse psychological and mental health outcomes in children (Wang G., et al., 2020). For example, introducing a new standard in social relations - social distancing – was harmful for socialization that's an important protective factor for emotional well-being in adolescents (Singh and Singh, 2020; Dalton, Rapa and Stein, 2020). Schools closure negatively affected the youngsters' daily routine (Qiu, et al., 2020). Children's leisure out of home was canceled: all creative studios, sports were closed, they were not allowed to go out with friends. Another important problem was moving the most part of everyday life in the virtual world due to lockdown.

The education system has been severely impacted by the COVID-19 crisis. The forced emergency transition of the education to the mode of distance and online education intensified the negative effects of the pandemic and significantly affected the quality of the educational process on all levels of education - from primary to high school education. Teachers and students, in addition to the general psychological problems caused by the pandemic, faced additional stress factors - the abruption of traditional school and university learning process, limited teaching resources and the methodological unpreparedness of some teachers to online education, the impersonal format of evaluating the results of mastering educational programs and exams grading, the lack of sufficient and important distance learning technical aids. Although online education was not new, but it was used as an additional resource but not as the main model in educational process. The interaction between subjects of educational process moved to impersonal format with the help of Teams, Zoom and other online platforms and programs (Harris, 2020). And soon after the pandemic outbreak an important paradox of online format of learning became obvious - students, whom teachers were supposed to teach distantly, were so-called "digital natives", those who from early childhood had high level technological knowledge and skills as they grew up in a digital environment and had digital socialization (Kamarianos, et al., 2020). This digital literacy gap between students and

educators could be harmful as reducing the traditionally authority and to some extent dominant role of the teacher. Therefore, all teachers, regardless of their IT competencies, had to think about changing the format of the lessons, the way of presenting information (Huber and Helm, 2020).

The COVID-19 pandemic affected the entire world and became a unique opportunity for scientists to assess the impact of stress on different samples within different cultures. People from different countries have their own unique understanding of the world, thus the response to stress can be culturally dependent. People are not passive recipients of social models of behavior and attitudes; they actively build their own perception of the world, based on their cultural traditions (Pines and Zaidman, 2003). For example, when comparing stress response in American and Asian cultures, it was found that Asians did not seek for social support in a stressful situation unlike Americans (Taylor and Asmundson, 2020). Cross-cultural studies showed that different cultures adhered to different patterns of stress response and of their relations with loved ones in a stressful situation (Adams and Boscarino, 2005).

The aim of this study was to find out if there were cross-cultural differences in perceived stress in Russian and Kyrgyz schoolchildren with high and low anxiety and depression levels during the initial stage of COVID-19 pandemic in 2020 and one year after in 2021 when the situation with pandemic was still severe and people suffered a lot for this period, and schoolchildren had already an experience of online / distant learning with more than half of a year.

The hypotheses of the present study are:

H1 – Schoolchildren are at risk regarding the development of stress and psychological symptoms, such as anxiety and depression, during the COVID-19 pandemic.

H2 - Schoolchildren with high as well as with normal levels of anxiety and depression from Russia and Kyrgyzstan demonstrate more pronounced perceived stress in 2021 in comparison to the initial stage of the COVID-19 pandemic in 2020.

H3 - There are cross-cultural differences in perceived stress in Russian and Kyrgyz schoolchildren with high levels of anxiety and depression both in 2020 and 2021.

Materials and Methods

Participants and Procedure

The study involved 1834 students aged 13 to 18 from Russia and Kyrgyzstan (Table 1). At the first stage (2020) 715 students took part in the study, and at the second stage (2021) - 1119 students from the same schools.

In Russia and Kyrgyzstan quarantine measures were introduced at the end of March, and since the 10th of April 2020 the learning process was switched into online mode. The data presented in the paper is a part of a larger project. There were two data collection periods in this project: (1) between 10th May, 2020 and 10th June, 2020; (2) between 18th May, 2021 and 15th June, 2021. The first period covered a time frame of the initial period of the COVID-19 pandemic, when lockdown, urgent school closures and online schooling were implemented in these countries. The second period time frame corresponded to the stabilization of the situation with COVID-19 pandemic in Russia and the new wave of pandemic expectation in Kyrgyzstan. Herewith in both countries preventing measures, such as social distancing and obligatory mask wearing were implemented, school children were back to offline schooling after at least half a year of distant/online learning experience.

This descriptive cross-sectional study was conducted via an online survey. The survey consisted of demographic variables, such as age, gender, year of schooling, and two validated self-reporting questionnaires - Hospital Anxiety and Depression Scale (HADS) and Perceived Stress Scale-10 (PSS-10). The data was collected using the DigitalPsyTools online platform (https://digitalpsytools.ru/), developed in the Center for Interdisciplinary Research in Education of the Russian Academy of Education.

Measures

Hospital Anxiety and Depression Scale (HADS, Zigmond and Snaith, 1983) was used to assess general levels of anxiety and depressive symptoms. The questionnaire includes 14 questions and 2 subscales: HADS-A consists of seven specifically designed items to measure the severity of anxiety symptoms, and the HADS-D consists of seven items to specifically measure the severity of depressive symptoms. Each item in HADS was rated on a four-point Likert scale, giving maximum score of 21. Total scores were divided into three categories: normal (0–7), borderline abnormal (8–10), and abnormal (11–28) cases of anxiety and depression. The Russian version of HADS questionnaire was used in the both countries (validation by Shal'nova, et al., 2014). Students both in Russia and Kyrgyzstan completed

questionnaires in Russian. In Kyrgyzstan, schoolchildren that study in Russian, took part in the survey.

The Perceived Stress Scale (PSS, Cohen, Kamarack and Mermelstein, 1983; Zhou and Lin, 2016) was used to assess stress levels in young people. The scale comprises of 10 items rated in our study on a five-point Likert scale, ranging from 'never' to 'very often'. The PSS-10 is a reliable measure of subjectively perceived stress levels over the past month. It has a two-dimensional structure, with one dimension related to perceived stress and the second related to stress resilience. In our study we used only total PSS score. The Russian version of PSS-10 was used to assess the actual stress level of respondents (Ababkov, et al., 2016).

We conducted a comparison of four independent groups of schoolchildren: Russian 2020, Kyrgyz 2020, Russian 2021, and Kyrgyz 2021.

Demographic features (age, gender) of the four cohorts were summarized using descriptive statistics (mean and standard deviation). Possible differences in demographic variables between groups were compared using Mann-Whitney test for continues variables. Study primary outcomes including perceived stress, anxiety and depression mean scores, and anxiety and depression severity levels were assessed using descriptive statistics. To assess the difference between groups/categories of anxiety, depression, perceived stress, we used the non-parametric Kruskal-Wallis test, since the variables did not have a normal distribution. After the discovery of statistically significant differences between groups, post hoc pairwise comparisons were made using the Mann-Whitney test. The analysis was performed using the SPSS v.24.0 statistical package (IBM, USA).

Results

Demographic characteristics

Demographic data (Table 1) showed that among Russian participants during the first data collection period in 2020 there were 595 schoolchildren (64,2 %, 382 girls), during the second data collection period in 2021 there were 639 schoolchildren (56,49%, 361 girls). Among Kyrgyz participants during the first data collection period in 2020 there were 120 schoolchildren (58,3%, 70 girls), during the second data collection period in 2021 there were 480 schoolchildren (56,45%, 271 girls). Mean age of Russian students in 2020 was 15,53 (SD = 1,15), in 2021 – it was 15,28 (SD = 1,16). Mean age of Kyrgyz students in 2020 was 16,04 (SD =1,04), in 2021 – it was 15,94 (SD = 0,86). The mean age in all groups were in the range of 15.5 and 16 years old.

Table 1

Sample summary

Sample	N	Russian 2020	Kyrgyz 2020	Russian 2021	Kyrgyz 2021
Females	1084	382	70	361	271
Males	750	213	50	278	209
All	1834	595	120	639	480
Age (M and SD)	15.58 (1.11)	15.53 (1.15)	16.04 (1.04)	15.28 (1.16)	15.94 (0.86)

Note. M - mean score, SD - standard deviation, N - number

Group differences in anxiety and depression levels

The descriptive statistics is presented in Table 2. The mean score of depression subscale for Russian schoolchildren in 2020 was 4.99 (SD 3.36), in 2021 was 5.17 (SD 3.52); for Kyrgyz schoolchildren in 2020 it was 6.18 (SD 3.5), in 2021 it was 5.68 (SD 3.2). The mean score of anxiety subscale for Russian schoolchildren in 2020 was 6.21 (SD 3.56), in 2021 was 6.54 (SD 3.67); for Kyrgyz schoolchildren in 2020 it was 6.63 (SD 3.89), in 2021 it was 7.15 (SD 3.86).

Table 2

Descriptive statistics of anxiety, depression and perceived stress in 4 groups

Group	*measure*	N	*M*	*SD*	*Min*	*Max*
R2020	Perceived stress (total score PSS-10)	597	25,50	6,139	10	44
	Anxiety (HADS)	595	6,21	3,558	0	18
	Depression (HADS)	595	4,99	3,356	0	17
K2020	Perceived stress (total score PSS-10)	120	25,88	6,06	13	40
	Anxiety (HADS)	120	6,63	3,892	0	17
	Depression (HADS)	120	6,18	3,498	0	14
R2021	Perceived stress (total score PSS-10)	639	25,83	5,838	10	45
	Anxiety (HADS)	639	6,54	3,664	0	18
	Depression (HADS)	639	5,17	3,523	0	17
K2021	Perceived stress (total score PSS-10)	480	27,06	6,398	10	46
	Anxiety (HADS)	480	7,15	3,855	0	20
	Depression (HADS)	480	5,68	3,214	0	16

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020; M - mean score, SD - standard deviation, N - number

Cross-cultural comparison showed that mean scores of anxiety subscale was significantly higher in Kyrgyz (7.15) to Russian (6.54) respondents in 2021 ($U=140867$, $Z = -2.343$, $p = 0.019$). The comparison of depression level between countries demonstrated significantly higher value in Kyrgyz respondents in 2021 ($U=137183$, $Z = -3.035$, $p = 0.002$) and in 2020 ($U=28485$, $Z = -3.510$, $p < 0.0001$). The main results in dynamics of anxiety and depression levels in Russian respondents from 2020 to 2021 suggested that the scores slightly increased. The same situation was with anxiety level in Kyrgyz respondents. However, the mean values of depression level in Kyrgyz respondents slightly decreased in 2021 (5.68) in comparison to 2020 (6.18).

The anxiety and depression severity levels in 4 groups were assessed according to scores corresponding to three categories: normal (0–7), borderline abnormal (8–10), and abnormal (11–28) cases of anxiety and depression. The individuals were afterwards grouped as Group 1 with normal and Group 2 with high (borderline abnormal + abnormal) levels of depression and anxiety (Table 3).

When analyzing the severity levels of depression, we found 22.9% of Russian schoolchildren and 38.3% of Kyrgyz with high levels of depression during the first stage of survey; and 26.4% of Russian schoolchildren and 29.8% of Kyrgyz with high levels of depression during the spring 2021. There were 32.9% of Russian schoolchildren and 37.5% of Kyrgyz with high levels of anxiety during the first stage of survey; and 38.3% of Russian schoolchildren and 42.5% of Kyrgyz with high levels of anxiety during the spring 2021. We found an increase in number of Russian schoolchildren with high levels of depression and anxiety. However, the percentage of schoolchildren with high level of depression decreased during the second year of pandemic in Kyrgyzstan.

Table 3

The percentage of girls and boys in groups with normal and high levels of anxiety and depression in 4 groups

group	gender	Measure			
		Level of Depression		Level of Anxiety	
		normal	high	normal	high
R2020	male	27.4%	8.4%	24.5%	11.3%
	female	49.7%	14.5%	42.5%	21.7%
	total	77.1%	22.9%	67.1%	32.9%
K2020	male	25%	16.7%	28.3%	24.2%
	female	36.7%	21.6%	34.2%	13.3%
	total	61.7%	38.3%	62.5%	37.5
R2021	male	31.7%	11.7%	29.7%	12.8%
	female	41.9%	14.7%	31.9%	25.6%
	total	73.6%	26.4%	61.7%	38.3%
K2021	male	31%	12.5	30.2%	13.3%
	female	39.2	17.3	27.3%	29.2%
	total	70.2%	29.8%	57.5%	42.5%

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020.

The analysis revealed that girls had significantly higher levels of anxiety than boys in groups of Russians with a normal level of anxiety in 2020 ($U = 14177$, $Z = -3.909$, $p < 0.0001$) and in 2021 ($U = 14868$, $Z = -4.038$, $p < 0.0001$); and in group of Kyrgyz schoolchildren in 2021 with a normal level of anxiety ($U = 6653$, $Z = -4.349$, $p < 0.0001$). There were no significant differences between male and females in all groups with normal levels of depression.

The analysis in groups with high levels of anxiety and depression from both countries showed the same pattern of negative emotional reactions: girls are more anxious by COVID-19 than boys among the cohort of Russians in 2020 ($U = 3580$, $Z = -2.002$, $p = 0.045$); and suffered more from pronounced depressive symptoms in the cohort of Russians in 2021 ($U = 2718$, $Z = -2.603$, $p = 0.009$). The opposite model of statistically significant pronounced depressive behavior was found in Kyrgyz boys in 2020 ($U = 166$, $Z = -2.120$, $p = 0.034$).

Group differences of situational stress levels in the COVID-19 pandemic in respondents with normal and high levels of anxiety and depression

The stress levels in 4 groups of schoolchildren were assessed using PSS questionnaire (Table 2). The level of situational stress in Russian schoolchildren in 2020 was 25.5 (SD = 6.1), in 2021 it remained mostly on the same level 25.8 (SD = 5.8). In Kyrgyz schoolchildren in 2020 it was 25.88 (SD = 6.06), in 2021 it increased to 27.06 (SD = 6.398), that was significantly higher ($U = 25921$, $Z = -1.69$, $p = 0.09$). According to the mean values, schoolchildren from both countries had moderate level of situational stress during 2 years of the COVID-19 pandemic. However, cross-cultural analysis showed significantly lower ($U = 138231$, $Z = -2.83$, $p = 0.09$) negative emotional reactions among Russian schoolchildren (25.9) in 2021 compared to Kyrgyz schoolchildren (27.1).

On the next step in perceived stress levels analysis participants were divided in 8 groups with normal and high anxiety (Table 4) and depression levels (Table 5):

- Russians with normal anxiety level;
- Russians with high anxiety level;
- Kyrgyz with normal anxiety level;
- Kyrgyz with high anxiety level;
- Russians with normal depression level;
- Russians with high depression level;
- Kyrgyz with normal depression level;
- Kyrgyz with high depression level.

Table 4

Perceived stress levels in schoolchildren with normal and high anxiety levels

Level of anxiety	group	PSS (total score)				
		N	Mean	SD	Min	Max
normal	R2020	399	23,48	5,65	10	41
	K2020	75	23,89	5,92	13	38
	R2021	394	23,52	5,40	10	38
	K2021	276	23,86	5,25	10	37
high	R2020	196	29,63	4,93	10	44
	K2020	45	29,18	4,74	19	40
	R2021	245	29,54	4,42	14	45
	K2021	204	31,39	5,15	18	37

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020; M - mean score, SD - standard deviation, N - number

Table 5

Perceived stress levels in schoolchildren with normal and high depression levels

Level of depression	group	PSS (total score)				
		N	Mean	SD	Min	Max
normal	R2020	459	24,39	6,05	10	40
	K2020	74	24,84	5,81	13	38
	R2021	470	24,79	5,59	10	45
	K2021	337	25,42	5,98	10	45
high	R2020	136	29,28	4,81	14	44
	K2020	46	27,54	6,14	13	40
	R2021	169	28,72	5,53	10	44
	K2021	143	30,92	5,66	16	46

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020; M - mean score, SD - standard deviation, N - number

To assess if there were statistical differences between high and normal levels of anxiety within 4 groups, we applied pairwise comparisons using the Mann-Whitney test (with p-value=0.05). In all 4 groups we found significant results: in group of Russians in 2020 on anxiety scale ($U = 15499.5$, $Z = -12.016$, $p<0.0001$) and depression scale ($U = 16642.5$, $Z = -8.302$, $p < 0.0001$); in group of Russians in 2021 on anxiety scale ($U = 18410.5$, $Z = -13.184$, $p < 0.0001$) and depression scale ($U = 23548.5$, $Z = -7.870$, $p<0.0001$); in group of Kyrgyz in 2020 on anxiety scale ($U = 821$, $Z = -4.709$, $p < 0.0001$) and depression scale ($U = 1244.5$, $Z = -2.476$, $p = 0.013$); in group of Kyrgyz in 2021 on anxiety scale ($U = 8517.5$, $Z = -13.088$, $p < 0.0001$) and depression scale ($U = 12211$, $Z = -8.563$, $p < 0.0001$). We found statistical differences in 4 groups of schoolchildren with high levels of anxiety (Kruskal-Wallis test, $H = 18.482$, $df = 3$, $p < 0.0001$), as well as with high levels of depression ($H = 15.371$, $df = 3$, $p = 0.002$).

Afterwards we applied post hoc pairwise Mann-Whitney test (with p-value=0,0085). The cross-cultural analysis of Kyrgyz schoolchildren with high level of anxiety in comparison with Russians showed

significant differences in perceived stress in 2021 (U = 19703, Z = -3.874, p < 0.0001). The perceived stress of Kyrgyz schoolchildren with high level of depression was significantly higher than in Russians in the same year (U = 9630.5, Z = -3.098, p = 0.002). There were significant results in dynamics of actual stress level from 2020 to 2021 in group in Kyrgyz schoolchildren with high level of anxiety (U = 3441, Z = -2,634, p = .008) and with high level of depression (U = 2287.5, Z = -3.112, p = 0.002) as well.

We found the gender differences (with p-value=0.05) in stress scores. The stress level in girls with high and normal levels of anxiety and depression was significantly higher than in boys in all 4 groups in 2021:

- with normal level of anxiety in 2021 (U = 7539, Z = -2.964, p < .003), and with high level of anxiety in 2021 (U = 3361, Z = -2.867, p < .004) in Kyrgyz in 2021;
- with normal level of depression (U = 9652.5, Z = -4.909, p =.000), and with high level of depression (U = 1535, Z = -3.917, p =.000) in Kyrgyz in 2021;
- with normal level of anxiety in 2021 (U = 16824, Z = -2.267, p < .023), and with high level of anxiety in 2021 (U = 5778, Z = -2.133, p < .033) in Russians in 2021;
- with normal level of depression (U = 22940.5, Z = -2.858, p < .004), and with high level of depression (U = 2475.5, Z = -3.334, p < .001) in Russians in 2021.

Discussions

In the present study we analyzed how schoolchildren from different countries reacted to a stressful situation of the COVID-19 pandemic in spring 2020 during the initial stage of the pandemic and transition to distant/online learning, and one year after in spring 2021, when schoolchildren in both countries already had a great experience of online learning and both countries survived some serious stressful accidents of COVID-19. The findings proved that schoolchildren were at high risk regarding the development of stress and adverse psychological symptoms, such as anxiety and depression, during the COVID-19 pandemic.

The analysis of the severity of anxiety and depression symptoms both in Russia and in Kyrgyzstan showed that the mean scores were in the upper range of the normal level, and the level of perceived COVID-19 stress was moderate. When we compared the results in levels of anxiety and depression between two periods of survey in 2020 and 2021, the same tendency was found both in Russia and in Kyrgyzstan: an increase in depressive and anxiety symptoms during the year after the initial period of coronavirus outbreak that could mean a decrease in a well-being of schoolchildren across a broad set of human activities at school, with family, and in social life. All these could lead to severe problems in life satisfaction, which's considered a predictor of mental and physical health and successful adaptation to life (Zhou and Lin, 2016). These findings are in line with previous studies (Lee, Kim and Wachholtz, 2016; Praharso, Tear and Cruwys, 2017; Rogowska, Kuśnierz and Bokszczanin, 2020). Therefore, it's supposed that at both periods of survey, the threat of being infected of a coronavirus was not so frightened and didn't cause dissatisfaction in schoolchildren as the restrictions in everyday life caused by it.

Cross-cultural comparison revealed that anxiety and depression levels of Kyrgyz schoolchildren were significantly higher than in Russians. When analyzing the severity levels, we found the percentage of schoolchildren with severe depression and anxiety symptoms were high in Kyrgyzstan as well. However, the number of schoolchildren in Kyrgyzstan, who suffered much from depressive symptoms at the initial stage, decreased in a year after the outbreak of pandemic, that could be the reason of adaptation to online/distant learning. At the initial stage of COVID-19 many negative emotions and distress were caused by the transition to online learning, as well as the deterioration of relations with parents. The crisis in the education system due to COVID-19 caused the lack of personal communication when children and youth could learn and develop important social skills such as self-confidence, friendship, empathy, respect, compassion, responsibility. Normally the school provides a structured environment for positive socialization and harmonious development of students. With distant/online learning, the process of socialization changed, and was distorted (Richards, 2020), despite the opportunities of virtual communication via internet and social networks. The learning process was also negatively influenced by the pandemic, many schoolchildren felt stressed and dissatisfied with online learning that replaced the face-to-face educational process. The main changes in the learning process during the pandemic concerned mostly such characteristics of formal school face-to-face education, as fixed curriculum, uniform teaching methods, and feasibility in personal contact and support from teachers.

The cross-cultural comparison showed that the levels of depression, stress, and anxiety were mostly higher in Kyrgyz schoolchildren than in Russians. The stress level in more than 15% of Kyrgyz respondents in 2020 and around 23% in 2021 was high. Our findings partly proved the hypothesis that

there were cross-cultural differences in perceived stress in Russian and Kyrgyz schoolchildren with high levels of anxiety and depression both in 2020 and 2021. We found out that the level of perceived stress of Kyrgyz schoolchildren with high level of depression as well as with high level of anxiety were significantly higher than in Russian respondents during the second stage of survey in spring 2021. Schoolchildren from Kyrgyzstan not from Russia with high levels of anxiety and depression demonstrated more pronounced perceived stress in 2021 in comparison to the initial stage of the COVID-19 pandemic in 2020. The pandemic had much greater negative impact on Kyrgyz students. One of the possible reasons of it are the differences in cultural traditions. Another possible reason can be the differences in governmental strategies in coping with pandemic, such as total lockdown, quarantine or preventive measures. In case of Russia and Kyrgyzstan comparison, both reasons played sufficient role. People from traditional cultures, such as in Kyrgyzstan, according to the results of large cultural studies, demonstrated more pronounced stress reactions compared (Persike and Seiffge-Krenke, 2012) to people from individualistic cultures (Kim, Sherman and Taylor, 2008), such as Russia.

The events that occurred in Kyrgyzstan since the initial period of pandemic in March 2020 till the June 2021 influenced the emotional reactions to COVID-19. The initial stage of COVID-19 pandemic in Kyrgyzstan was less stressful than in Russia. During the first period of survey in May 2020, despite the lockdown till the middle of May in Kyrgyzstan, the situation was not yet much threatening, many people didn't believe in the existence of the virus and the imminence of coronavirus crisis. Therefore, the results from the first data collection period showed lower level of stress, not pronounced negative emotions such as anxiety and depression. However, the real COVID-19 crisis in Kyrgyzstan happened in July 2020, when the country was on the first places in world's rating list in number of infected and died people. Since the mid of the 2020 and till the spring 2021 the country survived a lot of problems in all spheres of life, that led to a great political crisis with forcible overthrow of the government in Kyrgyzstan. Since April 2021 the situation with pandemic became worse and many people were frightened of a new wave of COVID-19, which occurred in middle of June 2021.

Gender can be considered as an important predictor of negative psychological reactions during the pandemic. The findings from previous studies (Wang G., et al., 2020) suggested that females were more prone to psychological stress than males. With regard to age characteristics, young people aged 16-18 demonstrated the highest level of psychological stress (Qiu, et al., 2020). In our study the analysis in four cohorts of schoolchildren with high levels of anxiety showed the same patterns of negative emotional reactions: girls are more anxious with COVID-19 than boys. The stress level in girls with high and normal levels of anxiety and depression was significantly higher than in boys in all 4 groups in a year after the initial stage of pandemic. Kyrgyz boys demonstrated significantly more pronounced depressive behavior in spring 2020. Young people in general, and females in most are sensitive to various kinds of negative effects and vulnerable to stressful events such as pandemics, due to their personal immatureness and emotional lability.

Conclusions

The COVID-19 pandemic brought significant mental problems that affected the psychological well-being and health of all people, and children and youth in particular. The crisis of pandemic was characterized by uncertainty, vulnerability, unpredicted outcomes, sufficient changes in quality of life which caused anxiety, emotional distress, depression in people. Nowadays we can assess factors and conditions that determine the life within the COVID-19, as well as short-term outcomes for a period of several years since the world wide outbreak of the COVID-19. However, the stressors caused by the pandemic could have delayed and long-term adverse outcomes. This is especially important to study on behalf of the younger generation, since they are the most sensitive and emotionally labile social group, actively responding to changes in their environment. On the other hand, psychological problems of schoolchildren were exacerbated by an additional important stress - a sharp transition to distance/online learning. Our findings disclosed important aspects of the impact of COVID-19 on schoolchildren, including cross-cultural differences and dynamics in development of stressful reactions, that is crucial as the emerging need of psychological aid and for supporting schoolchildren mental health.

Acknowledgements

The paper is part of the project no. 20-04-60394, funded by RFBR (Russia).

Conflict of interests

The authors declare no conflict of interest.

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available due to compliance with institutional guidelines but they are available from the corresponding author on a reasonable request.

Informed Consent Statement

Informed consent was obtained from all respondents involved in the study before completing the survey.

References

Ababkov, V. A., Baryshnikova, K., Vorontsova-Venger, O. V., Gorbunov, I. A., Kapranova, S. V., Pologaeva, E. A., & Stuklov, K. A. (2016). Validation of the Russian version of the questionnaire "Perceived stress scale -10". *Bulletin of St. Petersburg University. Psychology,* (2), 6-15. https://doi.org/10.21638/11701/spbu16.2016.202

Adams, R. E., & Boscarino, J. A. (2005). Stress and well-being in the aftermath of the World Trade Center attack: The continuing effects of a communitywide disaster. *Journal of Community Psychology, 33*(2), 175-190. https://doi.org/10.1002/jcop.20030

Basheti, I. A., Mhaidat, Q. N., & Mhaidat, H. N. (2021). Prevalence of anxiety and depression during COVID-19 pandemic among healthcare students in Jordan and its effect on their learning process: A national survey. *PloS one, 16*(4), e0249716. https://doi.org/10.1371/journal.pone.0249716

Bukhari, E. E., Temsah, M. H., Aleyadhy, A. A., Alrabiaa, A. A., Alhboob, A. A., Jamal, A. A., & Binsaeed, A. A. (2016). Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak perceptions of risk and stress evaluation in nurses. *The Journal of Infection in Developing Countries, 10*(08), 845-850. https://doi.org/10.3855/jidc.6925

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research, 287*, 112934. https://doi.org/10.1016/j.psychres.2020.112934

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of health and social behavior,* 385-396. https://doi.org/10.2307/2136404

Cohen, S. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health* (pp. 31–67). Sage Publications, Inc.

Cosco, T. D., Doyle, F., Ward, M., & McGee, H. (2012). Latent structure of the Hospital Anxiety And Depression Scale: a 10-year systematic review. *Journal of psychosomatic research, 72*(3), 180-184. https://doi.org/10.1016/j.jpsychores.2011.06.008

Dalton, L., Rapa, E., & Stein, A. (2020). Protecting the psychological health of children through effective communication about COVID-19. *The Lancet Child & Adolescent Health, 4*(5), 346-347. https://doi.org/10.1016/S2352-4642(20)30097-3

Danese, A., Smith, P., Chitsabesan, P., & Dubicka, B. (2019). Child and adolescent mental health amidst emergencies and disasters. *The British Journal of Psychiatry, 216*(3), 159-162. https://doi.org/10.1192/bjp.2019.244

Espinola, M., Shultz, J. M., Espinel, Z., Althouse, B. M., Cooper, J. L., Baingana, F., ... & Rechkemmer, A. (2016). Fear-related behaviors in situations of mass threat. *Disaster health, 3*(4), 102-111. https://doi.org/10.1080/21665044.2016.1263141

Harris, A. (2020). COVID-19–school leadership in crisis?. *Journal of Professional Capital and Community, 5*(3/4), 321-326. https://doi.org/10.1108/JPCC-06-2020-0045

Huber, S. G., & Helm, C. (2020). COVID-19 and schooling: evaluation, assessment and accountability in times of crises—reacting quickly to explore key issues for policy, practice and research with the school barometer. *Educational Assessment, Evaluation and Accountability, 32*(2), 237-270. https://doi.org/10.1007/s11092-020-09322-y

Hyland, P., Shevlin, M., McBride, O., Murphy, J., Karatzias, T., Bentall, R. P., ... & Vallières, F. (2020). Anxiety and depression in the Republic of Ireland during the COVID-19 pandemic. *Acta Psychiatrica Scandinavica, 142*(3), 249-256. https://doi.org/10.1111/acps.13219

Kamarianos, I., Adamopoulou, A., Lambropoulos, H., & Stamelos, G. (2020). Towards an understanding of university students' response in times of pandemic crisis (COVID-19). *European Journal of Education Studies, 7*(7). https://doi.org/10.46827/ejes.v7i7.3149

Kang, L., Li, Y., Hu, S., Chen, M., Yang, C., Yang, B. X., ... & Liu, Z. (2020). The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. The Lancet. *Psychiatry, 7*(3), e14. https://doi.org/10.1016/S2215-0366(20)30047-X

Kim, H. S., Sherman, D. K., & Taylor, S. E. (2008). Culture and social support. *American Psychologist, 63*(6), 518–526. https://doi.org/10.1037/0003-066X

Lee, J., Kim, E., & Wachholtz, A. (2016). The effect of perceived stress on life satisfaction: The mediating effect of self-efficacy. *Ch'ongsonyonhak yongu, 23*(10), 29. https://doi.org/10.21509/KJYS.2016.10.23.10.29

Lohaus, A., Elben, C., Ball, J., & Klein-Hessling, J. (2004). School transition from elementary to secondary school: Changes in psychological adjustment. *Educational Psychology, 24*(2), 161-173. https://doi.org/10.1080/0144341032000160128

Lupe, S. E., Keefer, L., & Szigethy, E. (2020). Gaining resilience and reducing stress in the age of COVID-19. *Current opinion in gastroenterology, 36*(4), 295-303. https://doi.org/10.1097/MOG.0000000000000646

Matsuishi, K., Kawazoe, A., Imai, H., Ito, A., Mouri, K., Kitamura, N., ... & Mita, T. (2012). Psychological impact of the pandemic (H1N1) 2009 on general hospital workers in Kobe. *Psychiatry and clinical neurosciences, 66*(4), 353-360. https://doi.org/10.1111/j.1440-1819.2012.02336.x

Maunder, R. G., Lancee, W. J., Balderson, K. E., Bennett, J. P., Borgundvaag, B., Evans, S., ... & Wasylenki, D. A. (2006).

Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerging infectious diseases, 12*(12), 1924. https://doi.org/10.3201/eid1212.060584

Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracuti, S., Napoli, C., & Roma, P. (2020). A nationwide survey of psychological distress among Italian people during the COVID-19 pandemic: immediate psychological responses and associated factors. *International journal of environmental research and public health, 17*(9), 3165. https://doi.org/10.3390/ijerph17093165

Meledandri, G., & Trimarco, B. (2021). Distress and psychological impact of Covid-19 pandemic and previous outbreaks. Review and methodological suggestions. *International Journal of Behavioral Research & Psychology, 9*(01), 275-283. https://doi.org/10.19070/2332-3000-2100049

Muratori, P., & Ciacchini, R. (2020). Children and the COVID-19 transition: psychological reflections and suggestions on adapting to the emergency. *Clinical Neuropsychiatry, 17*(2), 131. https://doi.org/10.36131/CN20200219

Persike, M., & Seiffge-Krenke, I. (2012). Competence in coping with stress in adolescents from three regions of the world. *Journal of youth and adolescence, 41*(7), 863-879. https://doi.org/10.1007/s10964-011-9719-6

Pfefferbaum, B., & North, C. S. (2020). Mental health and the Covid-19 pandemic. *New England Journal of Medicine, 383*(6), 510-512. https://doi.org/10.1056/NEJMp2008017

Pines, A. M., & Zaidman, N. (2003). Gender, Culture, and Social Support: A Male-Female, Israeli Jewish-Arab Comparison. Sex Roles: *A Journal of Research, 49*(11-12), 571–586. https://doi.org/10.1023/B:SERS.0000003128.99279.94

Praharso, N. F., Tear, M. J., & Cruwys, T. (2017). Stressful life transitions and wellbeing: A comparison of the stress buffering hypothesis and the social identity model of identity change. *Psychiatry research*, 247, 265-275. https://doi.org/10.1016/j.psychres.2016.11.039

Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *General psychiatry, 33*(2). https://doi.org/10.1136/gpsych-2020-100213

Richards, C. (2020). Viewpoint: Thoughts on whole school inspection post-Covid. *London Review of Education*. 18(3):511-518. https://doi.org/10.14324/LRE.18.3.13

Rogowska, A. M., Kuśnierz, C., & Bokszczanin, A. (2020). Examining anxiety, life satisfaction, general health, stress and coping styles during COVID-19 pandemic in Polish sample of university students. *Psychology Research and Behavior Management, 13*, 797-811. https://doi.org/10.2147/PRBM.S266511

Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., ... & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and health, 16*(1), 1-11. https://doi.org/10.1186/s12992-020-00589-w

Shal'nova, S. A., Evstifeeva, S. E., Deev, A. D., Artamonova, G. V., Gatagonova, T. M., Duplyakov, D. V., ... & Toguzova, Z. A. (2014). The prevalence of anxiety and depression in various regions of Russian Federation and their connection with socio-demographic factors (according to the ESSE-RF study). *Therapeutic Archives, 86*(12), 53-60. Russian. https://doi.org/10.17116/terarkh2014861253-60

Shanahan, L., Steinhoff, A., Bechtiger, L., Murray, A. L., Nivette, A., Hepp, U., ... & Eisner, M. (2022). Emotional distress in young adults during the COVID-19 pandemic: evidence of risk and resilience from a longitudinal cohort study. *Psychological medicine, 52*(5), 824-833. https://doi.org/10.1017/S003329172000241X

Singh, J., & Singh, J. (2020). COVID-19 and its impact on society. *Electronic Research Journal of Social Sciences and Humanities, Vol 2: Issue I*. Available at SSRN: https://ssrn.com/abstract=3567837

Taylor, S. (2019). *The psychology of pandemics: Preparing for the next global outbreak of infectious disease*. Cambridge scholars publishing.

Taylor, S., & Asmundson, G. J. (2020). Life in a post-pandemic world: What to expect of anxiety-related conditions and their treatment. *Journal of anxiety disorders, 72*, 102231. https://doi.org/10.1016/j.janxdis.2020.102231

Tull, M. T., Edmonds, K. A., Scamaldo, K. M., Richmond, J. R., Rose, J. P., & Gratz, K. L. (2020). Psychological outcomes associated with stay-at-home orders and the perceived impact of COVID-19 on daily life. *Psychiatry research*, 289, 113098. https://doi.org/10.1016/j.psychres.2020.113098

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International journal of environmental research and public health, 17*(5), 1729. https://doi.org/10.3390/ijerph17051729

Wang, G., Zhang, Y., Zhao, J., Zhang, J., & Jiang, F. (2020). Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet, 395*(10228), 945-947. https://doi.org/10.1016/S0140-6736(20)30547-X

Xiang, Y. T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The lancet psychiatry, 7*(3), 228-229. https://doi.org/10.1016/S2215-0366(20)30046-8

Zhou, M., & Lin, W. (2016). Adaptability and life satisfaction: The moderating role of social support. *Frontiers in Psychology, 7*, 1134. https://doi.org/10.3389/fpsyg.2016.01134

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta psychiatrica scandinavica, 67*(6), 361-370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x