QUALITY OF LIFE OF STUDENTS WITH DISABILITIES DURING THE COVID-19 PANDEMIC ACCORDING TO THE SF-36 QUESTIONNAIRE

N.Yu. Tarabrina

Moscow Aviation Institute (National Research University),

Moscow, Russia

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Annotation. 188 students of the Moscow Aviation Institute with health limitations (HL) and disabilities (110 young men and 78 young women) aged 18-20 years studied the quality of life (QOL) during the COVID-19 pandemic (autumn 2020) using the Russian version of the SF-36 questionnaire. It is shown that the values of all studied scales were lower than the standardized population values for this age category, regardless of gender. Female students had better QOL indicators compared to male students ($p<0,05-0,01$). The decrease in the level of mental health in young men is directly correlated with the indicators of vitality ($r=0,728$) and self-assessment of their mental state ($r=0,814$). The study is of practical importance for the organization of psychological support for students with health limitations and disabilities at the university.

Introduction. In attempts to hold the COVID-19 spread, leading education institutions in most countries put the in-person learning on hold and switched over to online learning. According to the UNESCO, at the end of April 2020, 186 countries closed all educational institutions, which affected 94% of the world contingent of students. Moreover, in countries with low and lower than average income, this indicator amounted to 99% [1-2]. At the initial stage of closing the highest educational institutions, more attention was given to the organization of distance learning, including measures for overcoming the digital gap [3]. Evaluation and prediction of possible consequences of long-term closures of schools and universities due to the COVID-19 pandemic in a short-term and long-term prospective is the main topic in the field of healthcare and education [4].

One of difficulties that teachers face while learning online is an ability to present high-quality educational services to students with health limitations (HL) and disabilities, especially in case of having complicated, multiple diseases. For example, absence of sign language interpreters for people with hearing loss, means for reading on a screen for people with visual organ disorders and an absence of

subtitles for those who study in a foreign language are serious obstacles in case of teaching students with HL in online environment [5].

Self-isolation, no socializing, changes in daily routine and learning formats, as well as other economic and contextual factors related to the pandemic, can affect quality of life (QOL) of the most vulnerable groups, including students with HL and their families [6].

According to the WHO's definition (1991), the quality of life is a perception of one's own position in life in the context of culture and system of values including physical, mental and social well-being [7].

Studying indicators of the quality of life allows evaluating results of the socially psychological, medical influence on a level of psychological comfort and social recovery. They are also used frequently for analysis of the disease's severity, features of work activities. The most common general and subjective questionnaire for evaluating quality of life is the SF-36 Health Status Survey [8]. This questionnaire is widely used in both population and specialized studies and allows obtaining a quantitative description of physical, emotional and social components of the quality of life.

The aim of the study is to examine the quality of life of students with HL and disabilities during the COVID-19 pandemic (according to data from the SF-36 questionnaire).

Methods and organization. The study was carried out in the Moscow Aviation Institute (National Research University) located in Moscow from 24 to 27.11.2020 according to the specially developed protocol approved by the Ethical Committee and corresponded with the standards of the international methodology of QOL studies. The sample included 188 students with HL and disabilities (110 young men and 78 young women) aged 18 to 20 years. The data collection was carried out through a survey of students with a direct questionnaire. After explaining to the students the goals of this questionnaire, we also gave information on how do we plan to use the study's results and explained rules of filling the SF-36 questionnaire. The respondents then filled the questionnaire once by themselves.

Those questionnaires that did not have data on gender and age or had skipped answers were excluded from the processing (1,59%). The rest ones were divided according to diseases and gender (98,4% of the planned 185 questionnaires).

The model that lies at the basis of constructing scales and total measurements of the SF-36 questionnaire has three levels: 36 questions, 8 scales, 2 total measurements that combine the scales. A subjective assessment of the state of health of students was carried out for the last 4 weeks. Each question was used once when calculating the score. The QOL analysis was made in accordance with following scales:

– Physical Functioning (PF) shows a degree, at which health limits performance of physical loads (self-maintaining, walking, going upstairs, carrying heavy objects etc.).

– Role Physical (RP) – an influence of physical state on role functioning (work, performing everyday activities).

– Bodily Pain (BP) – pain intensity and its effect on an ability to perform everyday activity, including housework and employment.

– General Health (GH) – an assessment of one's own state of health at the moment and prospects of treatment.

– Vitality (VT), which means having a lot of energy or feeling exhausted.

– Social Functioning (SF) is defined by a degree, in which physical or emotional state limits social activity (communication).

– Role Emotional (RE) – an effect of the emotional state on role functioning. It implies an assessment of a degree in which the emotional state hinders carrying out the work or other everyday activities (including increase in time spent on the work, reduced volume of the work, reduced quality of performed work etc.).

– Mental Health (MH) characterizes mood (signs of depression, anxiety, general indicator of positive emotions).

– Physical component summary (PCS) is a general indicator of physical health.

– Mental component summary (MCS) is a general indicator of mental health.

For all scales in case of absence of any limitations of health disorders, the maximum score is equal to 100. The higher the indicator in each scale, the better QOL according to this parameter. Before counting indicators of eight scales, we recoded answers (a process of recounting unprocessed points of the questionnaire into QOL points). Then, in order to get an answer for each scale, we summed recoded answers according to the method presented by the questionnaire's authors in the SF-36® v.2 guidelines [9]. Calculating QOL points for each of eight "transformed scales" was carried out according to the formula:

Transformed scale=([Σ – Min])/([Max-Min]) x100,

where Σ – is a total score of the scale, Min – minimally possible scale value, Max – maximally possible scale value.

Then we calculated mean values and standard derivation for each scale. Relations between indicators were calculated using the Spearman's rank correlation coefficient [10]. The results obtained were compared with population indicators of the QOL of young men and women aged 18-24 years according to results of the MIRAGE multi-centric QOL study [9].

Results and discussion. All studies included the transformation of the questionnaire's scales and calculation of mean values of these scales. However,

distribution of most of them was not normal, standard derivations had high values that shows a great data dispersion. Mean values of indicators of eight transformed scales of the SF-36 are presented in the table 1.

Mean values of 8 transformed scales of the SF-36 questionnaire (n=185)

SF-36 scales	M	σ
PF	88,01	11,02
RP	74,15	44,52
BP	77,85	24,96
GH	59,93	22,79
VT	54,64	21,43
SF	73,44	24,39
RE	59,81	30,80
MH	60,68	21,40
PCS	53,11	9,80
MCS	42,76	12,36

As it was shown in the table 1, mean values of QOL were substantially different from the 100% level of "ideal" health. In order to approximate the distribution to the normal one and create a possibility of direct interpretation of QOL indicators, we standardized values of each SF-36 scale.

In order to standardize each scale's values, we chose a 50% level from the ideal health and the same standard derivation that is equal to 10. That is the reason why each point of differences or changes in the score had direct interpretation: one point of changes corresponded with one tenth of the standard derivation and was equal to 0,10. Calculation formulae for each scale are presented in the table 2.

SF-36 scales standardization

Z-score of transformed scales	Standardization of each scale
$PF\_z = (PF - 88{,}01622) / 11{,}0239244$	$PF_{CT} = 50 + (PF\_z * 10)$
$RF\_z = (RF - 74{,}15314) / 44{,}5221434$	$RF_{CT} = 50 + (RF\_z * 10)$
$BP\_z = (BP - 77{,}85946) / 24{,}9632715$	$BP_{CT} = 50 + (BP\_z * 10)$
$GH\ z = (GH - 59{,}93514) / 22{,}7986486$	$GH_{CT} = 50 + (GH\ z * 10)$
$VT\_z = (VT - 54{,}64324) / 21{,}4349945$	$VT_{CT} = 50 + (VT\_z * 10)$
$SF\_z = (SF - 73{,}44232) / 24{,}3952133$	$SF_{CT} = 50 + (SF\_z * 10)$
$RE = (RE - 59{,}81114) / 30{,}8099108$	$RE_{CT} = 50 + (RE\ z * 10)$
$MH\_z = (MH - 60{,}68425) / 21{,}4026944$	$MH_{CT} = 50 + (MH\_z * 10)$
$PCS\_z = (PCS - 53{,}11973) / 9{,}80590275$	$PCS_{CT} = 50 + (MH\_z * 10)$
$MCS\_z = (MCS - 42{,}76141) / 12{,}3677697$	$MCS_{CT} = 50 + (MH\_z * 10)$

Note: PF, RF, BP, GH, VT, SF, RE, MH, PC – transformed values of each scale; _z – score of transformed scales; CT – standardized indicators of scales

Analysis of profiles of QOL of the whole sample of students revealed that almost each values of examined scales appeared to be lower than standardized population values for this age category. The difference amounted to 10-15%

(table 3) [9]. The highest indicators are in the BP scale that evaluates a pain syndrome's intensity and its effect on an ability to perform everyday activities – 56,49 points. The lowest indicators were registered in the PCS scale – 49,92 points. Since the correlation between these indicators is mean (r=0,648211), we assume that the pain syndrome was not the only one parameter that influenced a decrease in physical health.

Table 3

Standardized indicators of SF-36® V2 scales (mean values, derivations, 25%, 50% and 75% percentiles, minimum and maximum values) (n=185)

	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
Mean	50,00	50,00	50,00	50,00	50,00	50,00	50,00	50,00	50,00	50,00
25%	42,97	43,06	43,13	41,89	42,62	45,32	41,44	43,17	42,45	43,82
50%(Me)	51,98	52,44	56,49	50,66	50,76	50,64	52,23	52,27	49,92	52,50
75%	56,48	58,69	58,92	57,68	57,94	57,03	59,78	58,02	55,21	57,39
SD	10,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0
Min-Max	15-60	27-183	23-58	27-67	24-72	18-61	30-63	23-67	23-90	25-76
GIPN	55,15	49,10	49,89	49,19	52,20	52,27	52,25	50,59	–	–

Note: GIPN – general indicators of population norm for young men and women aged 18-24 years [9]

For the more detailed analysis, we examined results of young men and women separately. When describing the structure of examined scales in young men, we revealed that values of the GH and PCS scales was lower than the 50% level and was substantially different from those in young women (p<0,05). It is also important to note that role functioning and general health of young men is lower than population indicators for this age category by 8,09% and 14,28% (table 4). The reduced level of mental health in young men is in direct correlation with indicators of the VT (r=0,728) and a low indicator in the MH scale (r=0,814).

Table 4

Standardized indicators of SF-36® v2 scales (mean values, standard derivations, 25%, 50% and 75% percentiles, minimum and maximum values) for young men (n=107)

	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
Mean	51,75	51,56	51,64	51,47	52,28	51,70	51,31	52,76	48,70	50,55
25%	47,47	43,06	43,53	39,70	42,62	41,06	41,44	46,52	42,85	43,23
50% (Me)	56,48	50,88	56,49	48,47	50,76	52,77	52,23	52,75	49,62	52,35
75%	56,48	58,69	58,92	55,05	57,94	57,03	63,01	59,94	54,52	56,86
SD	10,13	9,62	9,85	9,68	10,04	10,67	10,07	9,75	8,28	8,32
Min-Max	15-60	27-58	23-58	27-67	26-72	18-61	30-63	21-67	23-65	26-65
PNm	57,13	55,00	54,83	55,40	52,20	52,27	52,24	50,59	–	–

Note**:** PNm – population norm of indicators for young men aged 18-24 years [9]

All examined scales in young women were statistically reduced from the population indicators: PF – by 9,90%, RP – by 16,13%, BP – by 7,85%, GH – by 7,75%, SF – by 13,76%, RE – by 15,24% and MH – by 8,45%. At the same time, PCS and MCR reduced by 19,14 and 25,16% (table 5). We also found a direct correlation

(r=0,756) of pain intensity's influence on the general health indicator, the GH scale also closely correlated with the PCS (r=0,706). The mental health level in young women has a strong correlation with the VT (r=0,738), RE (r=0,731) and MH (r=0,774) scales.

Table 5

Standardized indicators of SF-36® v2 scales (mean values, standard derivations, 25%, 50% and 75% percentiles, minimum and maximum values) for young women (n=107)

	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
Mean	49,79	51,07	49,88	51,47	51,69	49,95	50,15	49,52	50,12	51,89
25%	42,97	43,06	43,13	44,08	43,58	45,32	41,44	40,77	42,45	44,65
50%(Me)	51,98	52,44	56,49	52,85	53,15	50,64	52,23	50,35	50,03	54,52
75%	56,48	58,69	58,92	61,63	60,33	57,03	58,70	58,02	55,84	60,03
SD	9,78	18,84	10,46	10,27	10,63	10,35	10,07	10,97	11,68	10,77
Min-Max	20-60	7-183	27-58	27-65	24-67	22-61	30-63	27-67	29-90	25-76
PNw	57,13	60,90	60,93	56,95	54,47	57,61	60,19	54,60	–	–

Note: PNw – population norm of indicators for young women aged 18-24 years [9]

While comparing young men and women, we noted that the level of physical activity in young men was by 8% higher than in young women, RE and HG – 4% higher, GH and VT – 9,03% and 4,7% lower. It is also notable that the BP indicator was the same in both groups and amounted to 56,49 points. Generalized indicators of physical and mental health in young men was lower than in young women, but they did not have any significant differences.

Conclusion. Analysis of the standardized QOL indicators of students with HL and disabilities revealed that values of all scales appeared to be lower than standardized population values for this age group. Indicators of young men were significantly different from those of young women (p<0,05-0,001). Young men experience depression and anxiety that make learning and/or other everyday activity difficult for them (including an increase in time spent on the work, reduced volume of the work, reduced quality of performed work etc.). The mental health level of young men is in direct correlation with indicators of VT (r=0,728) and the MH scales (r=0,814). Most students (86,3%) confessed that they were worried by the influence of the COVID-19 pandemic on their lives. They experience reduced vitality, performance, even panic attacks, which severely limits them when learning and in society. Young girls also were sensitive about restrictions caused by the COVID-19. However, they adapt to changing conditions faster, which corresponds with the opinion of a number of authors, who studied response of men and women to stress [11].

Therefore, students are in need of psychological support. Different forms of psychological support at universities can be implemented: individual psychological consultations, work in groups aimed at overcoming anxiety and normalizing the emotional state of students, observation of students' adaptation to learning

conditions at universities (including methods of psychological diagnostics). In pandemic conditions, these events can be carried out in the distance format. Moreover, there is a need for organizing an interaction of psychological services of a university with all participants of the learning process (students, parents of underage students, teachers, curators of academic groups, university's administration office) in order to contribute to the adaptation of students with HL and disabilities at universities (including adaptation to distance learning).

References

1. Tarabrina N.Yu. Biomedical assessment of the effectiveness of a distance course in physical culture for students of a special medical group / N.Yu. Tarabrina // Modern Issues of Biomedicine. – 2021. – Vol. 5. – № 3. – P. 26. DOI: 10.51871/ 2588-0500_2021_05_03_2.

2. Fuentes M. Ability and Quality of Life during the coronavirus pandemic / M. Fuentes, A.J. Houtrob, M.V. Gutierrez // Journal of Hospital Medicine. – 2021. – № 16(5). – P. 316-318. DOI: 10.12788/jhm.3615.

3. Huang Zh. Learning from Global Education Arrangement during COVID-19 Pandemic Period / Zh. Huang // International J. of Management & Education in Human Development – 2021. – Vol. 65. – P. 80-85.

4. Martinez E.Z. Long-term forecasts of the COVID-19 epidemic: a dangerous idea / E.Z. Martinez, D.C. Aragon, A.A. Nunes // Revista da Sociedade Brasileira de Medicina Tropical. – 2020. – P. 53. DOI: 10.1590/0037-8682-0481-2020.

5. Lin Z.A digital promised land? Digital landscape as a heterotopia for disabled people in China / Z. Lin, Y. Liu // Information, Communication & Society. – 2020. – Vol. 23(8). – P. 1220-1234. DOI: 10.1080/1369118.2020.1776366

6. Khahro S.H. Are We Doing Enough for Students with Disabilities: A Case of Online Education During COVID-19 Pandemic? / S.H. Khahro, A. Md Yusof, M.A.A. Talpur, A.R. Khoso, F.H. Ali // Elementary Education Online. – 2020. – Vol. 19. – № 3. – P. 2180-2183. DOI: 10.17051/ilkonline.2020.03.735374.

7. The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization // Social Science & Medicine. – 1995. – Vol. 41. – № 10. – P.1403-1409. DOI: 10.1016/0277-9536(95)00112-k.

8. Ware J.E. The factor structure of the SF-36 Health Survey in 10 countries: results from the IQOLA Project / J.E. Ware, M. Jr. Kosinski, B. Gandek, N.K. Aaronson, G. Apolone, P. Bech, J. Brazier, M. Bullinger, S. Kaasa, A. Leplege, L. Prieto, M. Sullivan // International Quality of Life Assessment. Journal of Clinical Epidemiology. – 1998. – № 51. – P. 1159-1165. DOI: 10.1016/s 0895-4356(98)00110-3.

9. Amirdzhanova V.N. Population indicators of the quality of life according to the SF-36 questionnaire (results of the multicenter study of the quality of life «Mirage») / V.N. Amirdzhanova, D.V. Goryachev, N.I. Korshunov, A.P. Rebrov, V.N. Sorotskaya // Scientific and Practical Rheumatology. – 2008. – Vol. 46. – № 1. – P. 36-48.

10. Kobzar' A.I. Applied mathematical statistics / A.I. Kobzar' // Moscow: Publishing House "Fizmatlit". – 2006. – 816 p.

11. Zhukov D.A. Biology of behavior: humoral mechanisms / D.A. Zhukov // St. Petersburg: Speech. – 2007. – 442 p.

Information about the authors: Natal'ya Yur'evna Tarabrina – Candidate of Biological Sciences, Associate Professor of the Moscow Aviation Institute (National Research University), Moscow, e-mail: nata-tarabrina@mail.ru.