PSYCHOPHYSIOLOGICAL FEATURES OF STUDENTS AT DIFFERENT RISK OF INTERNET-ADDICTIVE BEHAVIOR

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Internet addiction is a behavioral problem that is rapidly growing increasingly widespread, especially among higher education students. This study aimed to profile psychophysiological characteristics of students at different levels of risk of developing behavior-modifying internet addiction. We invited 261 students and established their levels of internet addiction using the Chen Internet Addiction Scale, then formed two groups: group 1 — students showing no signs of internet addiction; group 2 — students prone to internet addiction. Students' mental and social health and quality of life were assessed. Compared to the participants from group 1, group 2 students were found to exhibit 1.7 times more intense compulsive symptoms, 1.5-fold stronger withdrawal and tolerance symptoms, and had intrapersonal/health issues and time management problems that were 1.3 and 1.4-fold more grave, respectively; all these factors contributed to their predisposition to internet addiction. The risk of internet addiction in group 2 externalized as greater irritability (1.5-fold higher than in group 1), resentment (1.4-fold higher), feelings of guilt and hostility (1.3-fold more intense), verbal aggression (1.2-fold), stress (1.3-fold), anxiety and negative emotional experiences (1.2-fold), and 1.2 times lower quality of life in terms of its psychological component. The resulting data suggest the need for prevention measures designed to reduce the risk of internet addiction through management of negative emotional states in students with the help of socio-psychological inventory.

Keywords: students, internet addiction, Chen Internet Addiction Scale, aggressive and hostile reactions, anxiety, negative emotional experiences, stress, social health, quality of life

Author contribution: Setko NP — study design and concept, manuscript editing; Zhdanova OM — manuscript writing, collection and processing of the material, statistical processing; Setko AG — manuscript writing, editing; all authors — approval of the final version of the article, responsibility for integrity of all of its parts.

Compliance with ethical standards: the study was conducted in compliance with the principles of the Declaration of Helsinki (Fortaleza, 2013). Each participant of the study submitted a signed voluntary informed consent form.

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Received: 11.11.2023 **Accepted:** 02.02.2024 **Published online:** 18.03.2024

DOI: 10.24075/rbh.2024.091

ПСИХОФИЗИОЛОГИЧЕСКИЕ ОСОБЕННОСТИ СТУДЕНТОВ С РАЗНЫМ УРОВНЕМ РИСКА ИНТЕРНЕТ-ЗАВИСИМОГО ПОВЕДЕНИЯ

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Интернет-зависимость — это поведенческая проблема, уровень распространенности которой стремительно увеличивается, особенно среди студенческой молодежи. Целью исследования было установить психофизиологические особенности студентов с разным уровнем риска интернет-зависимого поведения. У 261 студента выполнили диагностику интернет-зависимости по опроснику «Шкала интернет-зависимости Чена», после чего были сформированы две группы: 1-я группа — студенты без интернет-зависимого поведения, 2-я группа — студенты, склонные к формированию интернет-зависимости. Оценивали психическое и социальное здоровье, качество жизни студентов. Установлено, что у студентов 2-й группы склонность к интернет-зависимому поведению формировалась за счет увеличения в 1,7 раз выраженности компульсивных симптомов, а также симптомов отмены и толерантности — в 1,5 раза, внутриличностных проблем и проблем, связанных со здоровьем, — в 1,3 раза, проблем управления временем — в 1,4 раза по сравнению со студентами 1-й группы. При этом риск развития интернет-зависимости у студентов 2-й группы характеризовался повышением раздражительности в 1,5 раза, обиды в — 1,4 раза, чувства вины и враждебности — в 1,3 раза, вербальной агрессии — в 1,2 раза, стресса — в 1,3 раза, тревожности и негативных эмоциональных переживаний — в 1,2 раза, а также снижением психологического компонента качества жизни в 1,2 раза по сравнению со студентами 1-й группы. Полученные данные определяют необходимость профилактических мероприятий, направленных на снижение риска развития интернет-зависимости посредством социально-психологической коррекции негативных эмоциональных состояний у студентов.

Ключевые слова: студенты, интернет-зависимость, шкала интернет-зависимости Чена, агрессивные и враждебные реакции, тревожность, негативные эмоциональные переживания, стресс, социальное здоровье, качество жизни

Вклад авторов: Н. П. Сетко — концепция и дизайн исследования, редактирование; О. М. Жданова — написание текста, сбор и обработка материала, статистическая обработка; А. Г. Сетко — написание текста, редактирование; все авторы — утверждение окончательного варианта статьи, ответственность за целостность всех частей статьи.

Соблюдение этических стандартов: исследование проведено в соответствии с принципами Хельсинкской декларации (Форталеза, 2013). От каждого участника исследования получено письменное добровольное информированное согласие.

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Статья получена: 11.11.2023 **Статья принята к печати:** 02.02.2024 **Опубликована онлайн:** 18.03.2024

DOI: 10.24075/rbh.2024.091

Over the past decades, internet and smartphones have grown increasingly relied on throughout the world, and became an important part of modern life [1]. According to the statistics, in 2021, almost 4.6 billion people accessed internet [2].

Used properly, internet gives quick and easy access to information, entertainment and social contacts, and simplifies communication. However, this environment is becoming not only a space of opportunities, but also that of risks, including

the risks of destructive and autodestructive behavior. Excessive and uncontrolled use of internet is associated with development of internet addiction and mental health problems [3]. Internet addiction is a behavioral problem that has gained greater scientific recognition over the past decade; some researchers call it "the 21st century epidemic" [4]. According to scientific data, Internet addiction is a non-chemical behavioral addiction stemming from human-machine (computer-internet) interaction with the following psychopathological symptoms: excessive use of internet associated with lack of control over screen time; neglect of work/study that degrades academic performance and productivity; irresistible obsessive desire to use internet; neglect of social life and search for social connections lacking in real life online [5–10].

Higher education students are particularly prone to developing behavior-modifying internet addiction. In medicine and healthcare, internet helps to practice evidence-based medicine, conduct research and training, access medical and online databases, treat patients in remote areas. The web is also used for academic and entertainment purposes. At the same time, limited or non-existent parental control, lifestyle of higher education students, use of internet in the context of studies (from preparations of projects to communication with peers and professors), its exam anxiety and stress relieve potential, as well as a primitive understanding of leisure time and lack of opportunities to realize intellectual and creative potential create risks of development of internet addiction.

This study aimed to profile psychophysiological characteristics of students at different levels of risk of developing behavior-modifying internet addiction.

METHODS

This was a cross-sectional study that involved 261 medical students of 5th and 6th years, 196 female and 65 male, conducted during the classroom studies period. To be included, participants had to sign the informed consent to examination. Chronic diseases and mental disorders were the exclusion criteria. The required sample size was not calculated in advance.

We used the Chen Internet Addiction Scale (CIAS) modified by K.A. Feklisov and V.L. Malygin [11] to assess the attitude of participants towards internet. The scale consists of 6 subscales that score compulsive symptoms (Com; obsessive desire to go online); withdrawal symptoms (Wit; peculiar to cessation of use of internet, associated with discomfort); tolerance symptoms (Tol; gauged by time online needed to achieve satisfaction); intrapersonal issues and health problems (IH); quality of time management (TM). Summed up, Com + Wit + Tol scores allow calculation of the integral (key) symptoms of internet addiction (IA-Sym), and IH + TM scores yield the internet addiction-associated problem indicator value (IA-Rp). The sum total of points scored on all CIAS subscales reflects the examinee's current status, which can be one of the following: 27 to 42 points — no internet addiction; 43 to 64 points — propensity to internet addiction/preaddictive stage; 65 points and above — diagnosed internet addiction.

Seeking to determine the specifics of the risk of internet addiction in group 1 (no internet addiction) and group 2 (prone to internet addiction), we analyzed the participants' mental and social health, and quality of life. The study did not include a control group of students suffering from internet addiction because they were too few.

To assess the participating students' mental health, we used the Buss-Durkee Hostility Inventory (1957) as standardized by A.A. Hwan, Yu.A. Zaitsev, Yu.A. Kuznetsova (2005).

To measure their anxiety, negative emotional experiences and cognitive activity in everyday and academic lives, we used the Spielberger State-Trait Anxiety Inventory as modified by A.D. Andreeva (1988). Their stress was gauged with the help of PSM-25 (Psychological Stress Measure scale). The participants' social health was explored with the help of E.V. Tsikalyuk questionnaire [12], which includes 25 questions in five blocks: block A — social adaptation, block B — relationships with others, block C — social activity, block D — attitudes to social norms, block E — value orientations; the scores are used to calculate the social health coefficient (Csh) by the following formula:

$$C_{sh} = (2 \bullet A + B - D - 2 \bullet E)/25.$$

Furthermore, a score from 1.5 to 2 points means a high level of social health and a prosocial type of functioning; from 0.5 to 1.4 points corresponds to an average level of social health and a conformal type of functioning; from –0.4 to 0.4 points translates into a low level of social health and inert social functioning; from –1.4 to –0.5 points signals of poor social health, asociality; and score from –2 to –1.5 points alarms of social illness, antisociality. As for the quality of life, we evaluated it using the MOS-SF-36 questionnaire by J.E. Ware (1992), as modified by V.R. Kuchma, E.I. Shubochkina, E.G. Blinova et al. (2016). The resulting points could fall into one of three tiers: 100 to 70 points meant that the participant found the quality of life good, 70 to 50 — satisfactory, below 50 points — unsatisfactory.

For statistical data analysis employing parametric methods of medical statistics, we used StatTech v. 3.1.8 (StatTech; Russia). Kolmogorov-Smirnov test enabled verification of normalcy of distribution; the resulting data distributed normally, and were presented as arithmetic means (M) and arithmetic mean errors (*m*). Calculating the Student's *t*-test for independent samples, we compared selected means, and subsequently established the level of statistical significance (p). The differences were considered significant at $p \leq 0.05$. To uncover the relationship between the studied psychophysiological indicators and internet addiction criteria, we applied the Pearson's chi-squared test (p) and established the determination coefficient (R).

RESULTS

We found only 1.5% of the participating students to have internet addiction, with 44.5% of the sample prone thereto (group 2) and 54.0% showing no signs thereof (group 1). Group 2 had 1.5-fold greater CIAS scores than group 1 (51.4 ± 1.16 vs. 34.7 ± 0.83 points, $p \leq 0.05$). As for the internet addiction symptoms, the scores in group 2 were 1.6 times higher than in group 1 (30.7 ± 0.69 vs. 19.5 ± 0.61 points, $p \leq 0.05$), and the former also scored 1.4 more points for problems related to internet addiction than the latter (20.7 ± 0.70 vs. 15.2 ± 0.43 points, $p \leq 0.05$). Considering other indicators, in comparison to group 1, group 2 had the compulsive symptoms score 1.7 times higher, that describing withdrawal symptoms and tolerance — 1.5 times higher, and gained 1.3 times and 1.4 times more points for intrapersonal/health-related issues and time management problems, respectively (Fig. 1).

Likely, maladaptive use of internet triggered aggressive behavior in group 1 (78.7% of participants), while students from group 1, on the in contrary, suppressed aggressive and hostile reactions (41.9%) (Fig. 2).

Therefore, compared to group 1, group 2 exhibited 1.5-fold higher level of irritability, 1.4-fold higher level of resentment,

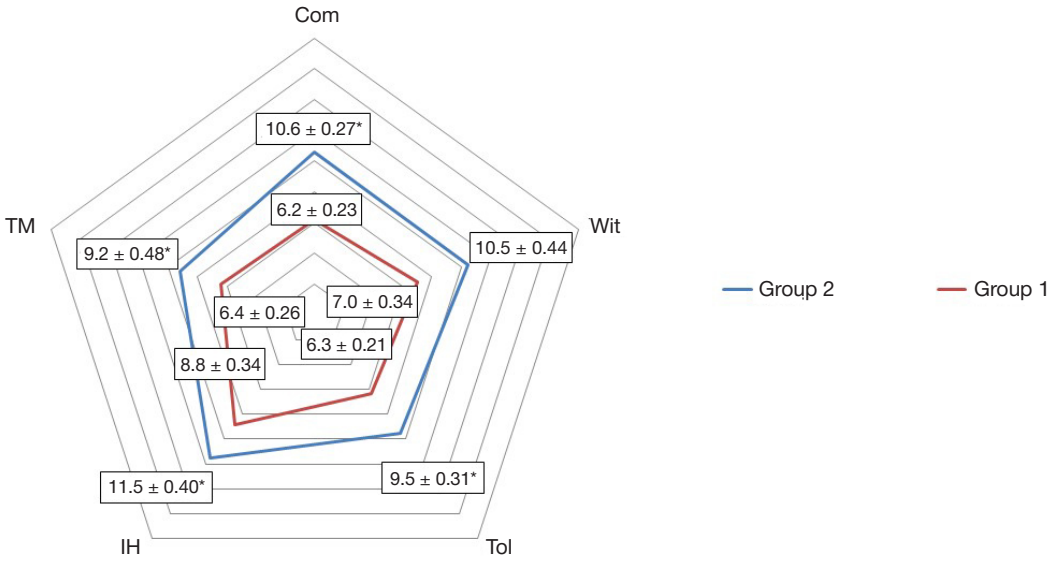

Fig. 1. Com — compulsive symptoms subscale; Wit — withdrawal symptoms subscale; Tol — tolerance symptoms subscale; IH — intrapersonal/health-related problems subscale; TM — time management subscale

1.3-fold higher level of guilt and hostility, 1.2-fold higher level of verbal aggression (Table 1).

Compared to group 1, group 2 had more students exhibiting high level of physical aggression (2.7 times more), high level of irritability (2.0 times more), high level of resentment (1.7 more), high level of guilt and indirect aggression (1.4 times more), and high level of verbal aggression (1.3 times more).

Moreover, compared to group 1, in group 2, we registered 15.1% higher level of anxiety in everyday life, 13.0% higher level of studies-related anxiety, 13.7% higher level of negative emotional experiences in everyday life, 13.3% higher level of studies-related negative emotional experiences (Table 2).

In group 2, 22.6% of students had a high level of everyday life anxiety and 48.1% — studies-related anxiety. In group 1, these figures were 6.7% (high level of everyday life anxiety) and 26.7% (high level of studies-related anxiety), respectively. As for everyday life negative emotional experiences, the shares of those that exhibited high level thereof were 37.0% in group 2 and 20.0% in group 1; studies-related negative experiences were reported to be high by 18.5% of group 2 participants and no one in group 1. These figures may explain why, compared to group 1, group 2 had 1.8 times less students exhibiting everyday life high cognitive activity, and 1.2 times less students highly active in their studies.

Considering aggression, anxiety and negative emotional experiences, group 2 scored 1.3 times more stress points than group 1 (79.7 ± 6.32 vs. 62.5 ± 4.84 points, $p \leq 0.05$). From the viewpoint of the level of stress, 60.4% of group 2 students and 79.3% of group 1 students had low level thereof, 22.2% of group 2 students and 20.7% of group 1 students — moderate level, and as for high level of stress, it was established in 17.4% of group 2 students and no one in group 1.

One of the typical negative consequences of internet addiction is social isolation, deteriorating social functioning [4–7]. The scores reflecting social health did not differ significantly between the two groups: 0.8 ± 0.09 in group 2 and 1.0 ± 0.05 in group 1 ($p \geq 0.05$). This makes the overall social health of the sample average, with social functioning conformal, characterized by latent rejection of the social environment; it is also likely that the students' behavior tends to change under pressure exerted by their social group. However, despite most participants being average in terms of social health (77.8% of group 2 and 89.5% of group 1), only 5.6% and 10.5% of students of groups 2 and 1, respectively, had social functioning at a high level, i.e., capable of adapting easily in 0social environments, while 16.7% of group 2 students registered poor social health, indicating the risk of social maladjustment and social passivity of students.

The resulting objective data that describe the state of mental and social health of students are reflected in their subjective assessments of own health and quality of life in general. It was found that the quality of life indicators recorded in group 2 were

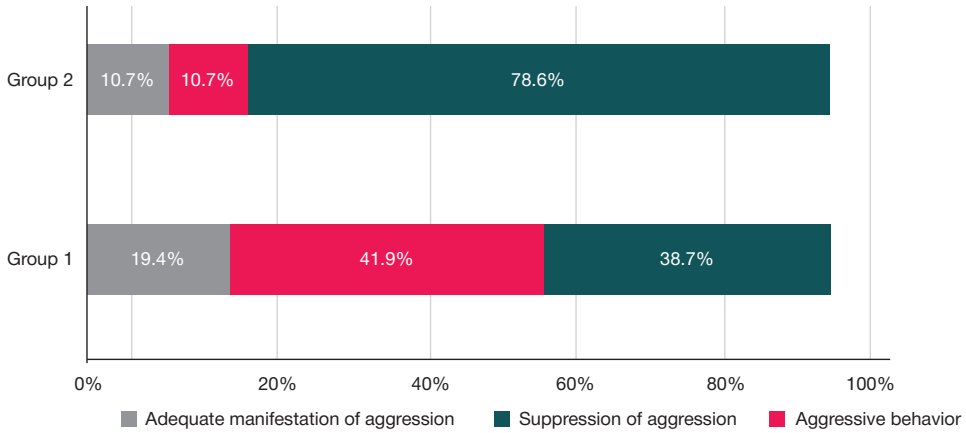

Fig. 2. Distribution of students by manifestation of aggression (%)

Table 1. Indicators of aggressive and hostile reactions, groups 1 and 2

Indicators	Group	M ± *m* (points)	Degree of severity of aggressive and hostile reactions (%)		
			Low	Moderate	High
Physical aggression	1st	3.7 ± 0.42	58.1	19.3	22.6
	2nd	3.8 ± 0.47	4.3	35.7	60
Indirect aggression	1st	3.3 ± 0.37	22.6	54.8	22.6
	2nd	3.7 ± 0.33	7.2	60.7	32.1
Irritation	1st	3.8 ± 0.48	19.3	35.5	45.2
	2nd	5.8 ± 0.37*	–	10.7	89.3
Negativism	1st	2.0 ± 0.26	48.4	16.1	35.5
	2nd	2.0 ± 0.25	46.4	10.7	42.9
Resentment	1st	2.5 ± 0.38	41.9	38.7	19.4
	2nd	3.5 ± 0.37*	14.3	53.6	32.1
Suspicion	1st	3.2 ± 0.30	16.2	41.9	41.9
	2nd	3.9 ± 0.37	3.6	50	46.4
Verbal aggression	1st	4.9 ± 0.37	9.7	41.9	48.4
	2nd	5.9 ± 0.42*	7.2	32.1	60.7
Guilt (autoaggression)	1st	4.4 ± 0.31	16.2	29	54.8
	2nd	5.7 ± 0.33*	7.1	17.9	75
Hostility index	1st	5.6 ± 0.60	6.5	22.6	71
	2nd	7.4 ± 0.65*	–	10.7	89.3
Aggressiveness index	1st	11.9 ± 0.81	–	6.5	93.5
	2nd	13.4 ± 0.93	–	7.1	92.9
Aggressive motivation level	1st	12.4 ± 1.02			
	2nd	15.4 ± 1.00*			

Note: * — $p \leq 0.05$ in comparison of the data describing both groups.

significantly inferior to those registered in group 1: on the pain intensity scale — by 13.0%, vitality scale — by 16.2%, social functioning scale — by 16.3%, role-based emotional functioning scale — by 33.0%, mental health scale — by 15.0%, integral psychological health scale — by 19.7% (Table 3).

A noteworthy fact is the two-fold difference in the number of students in groups 1 and 2 that considered their psychological health as unsatisfactory: 37.5% and 78.6%, respectively.

Analysis of the data given in Table 4 reveals a significant moderate correlation between compulsivity and irritability score ($r = 0.68 \pm 0.097$) and scores reflecting resentment ($r = 0.67 \pm 0.097$), guilt ($r = 0.63 \pm 0.102$), verbal aggression ($r = 0.67 \pm 0.098$). Withdrawal symptoms scores correlated with those describing stress ($r = 0.52 \pm 0.112$), vitality ($r = -0.61 \pm 0.104$), role-playing emotional functioning ($r = -0.61 \pm 0.104$), mental health ($r = -0.60 \pm 0.105$), psychological component of health ($r = -0.66 \pm 0.098$). We identified a moderate correlation between the tolerance irritability scores ($r = 0.66 \pm 0.099$), guilt ($r = 0.60 \pm 0.105$), resentment ($r = 0.70 \pm 0.094$), hostility ($r = 0.68 \pm 0.096$), anxiety ($r = 0.57 \pm 0.116$) and negative

Table 2. Personal qualities indicators, groups 1 and 2

Indicators	Group	M ± *m* (points)	Degree of severity (%)		
			Low	Moderate	High
Everyday life					
Anxiety	1st	18.5 ± 0.88	53.3	40	6.7
	2nd	21.8 ± 0.80*	14.8	63	22.2
Studies-related	1st	31.2 ± 0.85	6.7	40	53.3
	2nd	29.7 ± 0.76	3.7	66.7	29.6
Negative emotional experiences	1st	20.1 ± 1.08	43.3	36.7	20
	2nd	23.3 ± 0.90*	7.4	55.6	37
Studies-related					
Anxiety	1st	20.0 ± 1.09	30	43.3	26.7
	2nd	23.0 ± 0.68*	18.6	33.3	48.1
Studies-related	1st	29.4 ± 0.98	3.4	53.3	43.3
	2nd	29.2 ± 0.78	3.7	59.3	37
Negative emotional experiences	1st	11.7 ± 0.44	63.3	36.7	–
	2nd	13.5 ± 0.73*	40.7	40.7	18.6

Note: * — $p \leq 0.05$ in comparison of the data describing both groups.

Table 3. Quality of life indicators, groups 1 and 2

Scales	Group	M ± *m* (points)	Satisfaction with quality of life (%)		
			Good	Satisfactory	Unsatisfactory
Physical functioning	1st	93.1 ± 1.55	100	–	–
	2nd	94.6 ± 0.39	100	–	–
Role-based physical functioning	1st	78.1 ± 3.51	75	25	–
	2nd	69.6 ± 5.80	64.3	21.4	14.3
Pain scale	1st	91.3 ± 2.11	100	–	–
	2nd	79.4 ± 4.65*	71.4	14.3	14.3
General health status	1st	63.0 ± 3.50	37.5	37.5	25
	2nd	64.2 ± 2.57	35.7	42.9	21.4
Vitality scale	1st	66.9 ± 3.14	50	37.5	12.5
	2nd	56.1 ± 2.68*	14.3	57.1	28.6
Social functioning scale	1st	84.4 ± 2.92	87.5	12.5	–
	2nd	70.7 ± 3.15*	57.1	28.6	14.3
Role-based emotional functioning	1st	70.9 ± 6.30	50	25	25
	2nd	47.5 ± 6.64*	28.6	14.3	57.1
Mental health	1st	63.5 ± 3.08	25	50	25
	2nd	54.0 ± 2.85*	14.3	42.9	42.9
Physical component of health	1st	54.6 ± 0.93	–	75	25
	2nd	52.8 ± 1.12	–	85.7	14.3
Psychological component of health	1st	48.7 ± 1.80	–	62.5	37.5
	2nd	39.1 ± 1.86*	–	21.4	78.6

Note: * — $p \leq 0.05$ in comparison of the data describing both groups.

emotional experiences ($r = 0.62 \pm 0.103$), stress ($r = 0.62 \pm 0.103$), social health ($r = -0.61 \pm 0.104$), vitality ($r = -0.64 \pm 0.101$) and psychological component of health ($r = -0.62 \pm 0.103$). The scores reflecting intrapersonal problems correlated with everyday life ($r = 0.62 \pm 0.103$) and studies-related anxiety ($r = 0.67 \pm 0.103$), stress ($r = 0.63 \pm 0.102$), social health ($r = -0.65 \pm 0.101$), social functioning ($r = -0.67 \pm 0.098$), role-based emotional functioning ($r = -0.65 \pm 0.100$), mental health ($r = -0.66 \pm 0.099$) and psychological component of health ($r = -0.60 \pm 0.105$). Time management values correlated with social health ($r = -0.65 \pm 0.101$), vitality ($r = -0.68 \pm 0.096$), social functioning ($r = -0.67 \pm 0.098$), role-based emotional functioning ($r = -0.67 \pm 0.097$), mental health ($r = -0.67 \pm 0.097$) and psychological component of health ($r = -0.73 \pm 0.090$).

DISCUSSION

Multiple studies indicate that internet addiction has many negative consequences [6–10, 13–24]. The key health risks associated with maladaptive use of internet are eye strain (computer visual syndrome) and stress of the musculoskeletal system (pain in the neck, back, hands), involuntary rejection of the most important healthy lifestyle components (proper diet, physical activity, outdoor walks, sleep, leisure activities) [6–10,13–21]. In addition, escape from the real life complicates interpersonal relationships, entails loss of friends, problems in family functions, and leads to social maladaptation of students [6–10]. The desire to spend more and more time online, neglecting educational activities, and an obsessive wish to use internet become the main reasons behind loss of interest in everyday life and studies, as well as poor academic performance [6–10]. Ultimately, excessive use of internet translates into mental health problems such as stress, anxiety, depression, and social dysfunction [22–24].

This study found that aptitude to internet addiction in group 2 was characterized by the development of compulsive symptoms, which were 1.7 times more intense than in group 1; withdrawal symptoms and tolerance, which were 1.5 times stronger; intrapersonal issues and health-related problems, which were by 1.3 more severe; and time management problems, which were 1.4 times more complicated. Against the background of development of symptoms of internet addiction, more than half of the students of group 2 registered a high level of irritation (89.3%), verbal aggression (60.7%), feeling of guilt (75.0%); 22.0 to 48.1% of the participants had a high level of anxiety, 18.6% to 37.0% — experienced negative emotional experiences. High level of stress was registered in 17.4% of the students, 16.7% of them suffered social health deterioration, and for 78.6%, psychological component of the quality of life was declining.

Currently, there are only rudimentary internet addiction prevention efforts realized in Russia, especially concerning hygienic training and education. Young people are not aware of the basics of internet addiction prevention, and parents and teachers do not focus on the development of safe internet use skills in young people. In addition, the data from research activities and statistics have not been aggregated, i.e., it is impossible to assess the extent of internet addiction and the level of its severity among young people, which would allow identification of prevention priorities. The primary factor complicating the assessment of prevalence of internet addiction is lack of a unified classification of its types and degrees. As a result, the data collected in studies are very contradictory. For example, study [25] concludes that 2.3% of medical students show signs of internet addiction, and 13.9% of the sample had more serious respective problems. Another study [26] stated that 8.2% of the participating medical students had a pronounced and stable form of internet addiction. A study that involved medical students from Minsk has shown 62.5% of them to have internet addiction of low degree, 30.4% of average degree, and 4.4% of high degree [27]. In Moscow,

Table 4. Correlation of internet addiction criteria and psychophysiological indicators (units)

Psychophysiological indicators		Internet addiction indicators							
		Com	Wit	Tol	IH	TM	IA-Sym	IA-Rp	Overall score CIAS
Physical aggression		0.09 ± 0.131	0.10 ± 0.131	0.03 ± 0.131	–0.06 ± 0.131	0.16 ± 0.130	0.09 ± 0.131	0.06 ± 0.131	0.08 ± 0.131
Indirect aggression		0.12 ± 0.130	0.25 ± 0.127	0.13 ± 0.130	–0.04 ± 0.131	0.12 ± 0.130	0.19 ± 0.129	0.05 ± 0.131	0.15 ± 0.130
Irritation		0.68 ± 0.097*	0.32 ± 0.240**	0.66 ± 0.099*	0.19 ± 0.129	0.31 ± 0.125***	0.68 ± 0.096*	0.29 ± 0.126***	0.68 ± 0.097*
Negativism		0.03 ± 0.131	0.07 ± 0.131	–0.13 ± 0.131	–0.04 ± 0.131	0.01 ± 0.131	0.01 ± 0.131	0.01 ± 0.131	0.01 ± 0.131
Resentment		0.67 ± 0.097*	0.09 ± 0.131	0.70 ± 0.094*	0.22 ± 0.128	0.27 ± 0.127***	0.67 ± 0.097*	0.29 ± 0.126***	0.60 ± 0.105*
Suspicion		0.12 ± 0.130	0.04 ± 0.131	0.28 ± 0.126***	0.23 ± 0.128	0.32 ± 0.125***	0.12 ± 0.130	0.32 ± 0.124***	0.22 ± 0.128
Verbal aggression		0.67 ± 0.098*	0.13 ± 0.130	0.14 ± 0.130	–0.03 ± 0.131	0.11 ± 0.131	0.20 ± 0.129	0.05 ± 0.131	0.16 ± 0.130
Feeling of guilt		0.63 ± 0.102*	0.28 ± 0.126***	0.60 ± 0.105*	0.37 ± 0.122**	0.32 ± 0.125**	0.65 ± 0.100*	0.60 ± 0.105*	0.67 ± 0.098*
Aggressiveness index		0.22 ± 0.128	0.21 ± 0.128	0.13 ± 0.130	–0.04 ± 0.131	0.18 ± 0.129	0.21 ± 0.128	0.07 ± 0.131	0.17 ± 0.129
Hostility index		0.22 ± 0.128	0.03 ± 0.131	0.68 ± 0.096*	0.25 ± 0.127***	0.32 ± 0.124**	0.63 ± 0.102*	0.34 ± 0.123**	0.69 ± 0.095*
Aggressive motivation level		0.30 ± 0.125***	0.24 ± 0.128	0.23 ± 0.128	0.05 ± 0.131	0.25 ± 0.127***	0.29 ± 0.126***	0.18 ± 0.129	0.26 ± 0.127***
Anxiety	I	0.28 ± 0.126***	0.18 ± 0.129	0.57 ± 0.116*	0.62 ± 0.103*	0.24 ± 0.128	0.61 ± 0.104*	0.63 ± 0.102*	0.64 ± 0.101*
	II	0.15 ± 0.130	0.19 ± 0.129	0.18 ± 0.129	0.67 ± 0.103*	0.12 ± 0.130	0.20 ± 0.129	0.23 ± 0.128	0.23 ± 0.128
Studies-related	I	–0.15 ± 0.130	–0.23 ± 0.128	–0.16 ± 0.130	–0.20 ± 0.129	–0.19 ± 0.129	–0.21 ± 0.128	–0.23 ± 0.128	–0.24 ± 0.128
	II	–0.04 ± 0.131	–0.04 ± 0.131	–0.05 ± 0.131	–0.01 ± 0.131	–0.02 ± 0.131	–0.02 ± 0.131	–0.05 ± 0.131	–0.01 ± 0.131
Negative emotional experiences	I	0.20 ± 0.129	0.16 ± 0.130	0.62 ± 0.103*	0.07 ± 0.131	0.11 ± 0.131	0.22 ± 0.128	–0.11 ± 0.131	0.19 ± 0.131
	II	0.19 ± 0.129	0.25 ± 0.127***	0.27 ± 0.126***	0.20 ± 0.129	0.18 ± 0.129	0.27 ± 0.126***	0.22 ± 0.128	0.27 ± 0.126***
Stress		0.33 ± 0.124**	0.52 ± 0.112*	0.62 ± 0.103*	0.63 ± 0.102*	0.30 ± 0.125***	0.64 ± 0.101*	0.63 ± 0.102*	0.67 ± 0.098*
Social health		–0.21 ± 0.128	–0.15 ± 0.130	–0.61 ± 0.104*	–0.65 ± 0.101*	–0.65 ± 0.101*	–0.30 ± 0.126***	–0.65 ± 0.100*	–0.64 ± 0.101*
Physical functioning		0.09 ± 0.130	–0.07 ± 0.130	0.09 ± 0.130	–0.20 ± 0.130	–0.08 ± 0.130	–0.09 ± 0.130	–0.16 ± 0.130	–0.01 ± 0.130
Role-based physical functioning		0.06 ± 0.130	–0.11 ± 0.131	–0.14 ± 0.130	–0.24 ± 0.130	–0.24 ± 0.131	–0.11 ± 0.130	–0.26 ± 0.131	–0.24 ± 0.130
Pain scale		0.15 ± 0.129	0.13 ± 0.130	0.11 ± 0.130	0.22 ± 0.130	0.09 ± 0.131	0.15 ± 0.132	0.17 ± 0.130	0.18 ± 0.130
General health status		–0.07 ± 0.12	–0.13 ± 0.13	–0.10 ± 0.12	–0.18 ± 0.13	–0.18 ± 0.13	–0.11 ± 0.11	–0.20 ± 0.13	–0.15 ± 0.11
Vitality scale		–0.51 ± 0.113*	–0.61 ± 0.104*	–0.64 ± 0.101*	–0.34 ± 0.124**	–0.68 ± 0.096*	–0.62 ± 0.103*	–0.69 ± 0.096*	–0.64 ± 0.101*
Social functioning scale		0.24 ± 0.127***	–0.32 ± 0.125**	–0.35 ± 0.123*	–0.67 ± 0.098*	–0.67 ± 0.098*	–0.34 ± 0.124**	–0.65 ± 0.100*	–0.70 ± 0.094*
Role-based emotional functioning		0.22 ± 0.128	–0.61 ± 0.104*	–0.35 ± 0.123***	–0.65 ± 0.100*	–0.67 ± 0.097*	–0.60 ± 0.105*	–0.65 ± 0.100*	–0.68 ± 0.097*
Mental health		–0.21 ± 0.128	–0.60 ± 0.105*	–0.31 ± 0.125*	–0.66 ± 0.099*	–0.67 ± 0.097*	–0.58 ± 0.107*	–0.69 ± 0.095*	–0.64 ± 0.101*
Physical component of health		0.11 ± 0.130	–0.11 ± 0.130	–0.13 ± 0.130	–0.25 ± 0.127***	–0.17 ± 0.129	–0.13 ± 0.130	–0.24 ± 0.128	–0.18 ± 0.129
Psychological component of health		–0.29 ± 0.126***	–0.66 ± 0.098*	–0.62 ± 0.103*	–0.60 ± 0.105*	–0.73 ± 0.090*	–0.67 ± 0.098*	–0.65 ± 0.100*	–0.63 ± 0.102*

Note: * — $p \leq 0.001$ (high level of statistical significance); ** — $p \leq 0.01$ (average level of statistical significance); *** — $p \leq 0.05$ (low level of statistical significance); Com — compulsive symptoms subscale; Wit — withdrawal symptoms subscale; Tol — tolerance symptoms subscale; IH — intrapersonal issues and health-related problems subscale; TM — time management subscale; IA-Sym — key symptoms of internet addiction; IA-Rp — problems related to internet addiction; I — in everyday life; II — studies-related.

internet addiction was detected in 9.2% of the participating medical students, and 28.65% used internet excessively. In the Udmurt Republic, internet addiction was diagnosed in 1.7% of the invited higher eduction students, signs thereof (average level internet addiction) in 25.7% of students, and 73.7% of those that took part in this study were announced to have no addiction [27]. Different internet addiction prevalence figures indicate that registration and evaluation of this condition, and the respective criteria, are still a problem, which points to the need to systematize the said criteria and use a unified scientifically based methodology when diagnosing internet addiction.

CONCLUSIONS

Our results indicate that aptitude for internet addiction is associated with negative changes in mental and social health and quality of life of students. They suggest the need for internet addiction screenings among higher education students and vocational school students, such screenings allowing to identify both at-risk students and internet-addicted students, and ensure timely preventive measures aimed at correcting psychological and social factors influencing development of addictive behaviors.

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