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CHAPTER 5

CYBER ADDICTION: A NEW VIEW AND APPROACHES TO DIAGNOSTICS

ABSTRACT

The evolution of views on the problem of Internet addiction is presented, information is given on its prevalence and comorbidity with mental disorders, and an overview of modern clinical classifications and psychometric tools for its diagnosis is done.

According to modern scientific research, conceptual developments and the I-PACE model, the authors propose to single out a single definition of "cyber addiction" to combine all variants of Internet addiction. The selection of a single definition of "cyber addiction" is based on the fact that the object of addiction is interacting with various information resources and technical means.

For the phenomenon of cyber addiction, the authors proposed clinical diagnostic criteria, which are based on the criteria for diagnosing mental and behavioural disorders due to the use of psychoactive substances of ICD-11 and provided characteristics of the boundary with normative behaviour when using various information resources and technical means. They developed and validated a new psychodiagnostic screening tool based on the proposed cyber addiction paradigm — the YSCAS scale (Yuryeva – Shornikov Cyber Addiction Scale).

KEYWORDS

Internet addiction, cyber addiction, diagnosis, YSCAS scale, computer addiction, mental health problem.

Internet addiction has become a new mental health problem in the 21st century. From 2001 to 2016 the number of Internet users increased by 1000 % [1].

As of January 2023, there were 5.16 billion Internet users worldwide, representing 64.4 % of the world's population. Out of these, 4.76 billion, or 59.4 % of the world's population, were users of social networks [2]. The global internet penetration rate is 62.5 %, with Northern Europe leading the way with 98 % internet penetration among the population. In fact, more than 80 % of adults in the United States state that they go online every day.

In the UNESCO program document "Towards Knowledge Societies" (2005), modern society is defined as a society based on knowledge [3]. New information technologies are an integral part of this society. In just a few decades, a cyber culture with its virtual worldview, various social networks and lifestyle has formed. People spend a lot of time in the virtual world and are largely dependent on it. The average global Internet user spends an average of about 7 hours a day using the Internet on all devices. Gradually, the information environment acquires the character of basic, and interpersonal and social relations acquire the character of secondary [4, 5].

In a society based on knowledge, the system "man-man" is gradually replaced by the system "man-machine", and Homo Faber turns into Homo Informaticus. The environment of modern man is changing from purely social to informational, which is accompanied by mental changes: the transformation of mental activity, emotional alienation, desocialization and destructive changes in the psyche [6].

The question of whether the Internet has a positive or negative effect on people has been debated for more than 25 years. Back in 1999, Kimberly Young et al. described cyber disorders and related mental health problems [7], and Maressa Hecht Orzack described a new generation of children – cyber kids [8]. With the advent of the Internet came the problem of Internet addiction. Currently, the Internet plays an increasingly important role in people's lives, and the line between the Internet and real life is becoming more blurred.

Data on the prevalence of cyber addictions are very variable, as different diagnostic tools are used, and different ages, gender, place of residence and mentality of population groups are studied. In addition, various types of addictive Internet use (addiction to Internet games, social networks, cybersex, and other types) are investigated, which narrows the diagnostic range. When using a descriptive review using electronic databases, as well as a hand search of relevant publications or cross-references from 1970 to 2010, Kaustav Chakraborty et al. concluded that the prevalence of Internet addiction among users ranges from 0.3 to 38 %, with a predominance of young men [9].

According to Aviv Weinstein, the prevalence of IA ranges from 1.5–8.2 % in the USA and Europe [10]. In the developed countries of the East, this indicator ranges from 4 to 18 % [11].

Among teenagers, cyber addiction rates are also very variable and range from 0.8 % in Italy [12] and 1 % in Korea [13] to 8.8 % among Chinese teenagers [14].

With the development of technologies and the appearance of virtual reality, augmented reality, and the widespread use of social networks and online games, the idea of the genesis of Internet addiction is changing, and the use of the term Internet addiction is becoming less accurate to describe the negative phenomena that occur when these technologies are abused [15]. In this regard, the definition, clinical diagnostic criteria and tools for the diagnosis of this disorder need to be modified. The analysis of the current state of the study of this problem and the results of our own research allowed us to consider the addiction that occurs when using the Internet, accompanied by mental problems and the lack of harmonious integration, as cyber addiction [16]. Based on this paradigm, we developed clinical diagnostic criteria and a psychometric screening tool for the diagnosis of this disorder, which is the basis for their successful prevention, correction and treatment.

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5.1 EVOLUTION OF IDEAS ABOUT CYBER ADDICTION

Until the 1980s, computer networks were mainly used only by employees of special institutions. Since the 1980s, the distribution of personal computers and communication on the Internet among the population began. In 1990, Isaac Marks wrote that excessive use of the Internet could be considered a form of technological addiction that affects a wide range of behavioural reactions [17].

The Internet officially became publicly available in 1991, and the existence of computer addiction among Internet users was recognized in the United States as early as 1995. The definition of Internet addiction as a behavioural disorder due to Internet and computer use was given by Ivan Goldberg in 1996 [18].

Kimberly Young presented the second concept – problem Internet use (PIU). Using criteria similar to pathological gambling, she suggested that problematic Internet use is closer to impulse control disorder than to addictive conditions. She considered the term "Internet addiction" as a broad concept that means a large number of behavioural and impulse control problems [19].

She identified and described 5 types of internet addiction: computer addiction, net compulsions, information overload, cyber-relational addiction and cybersexual addiction.
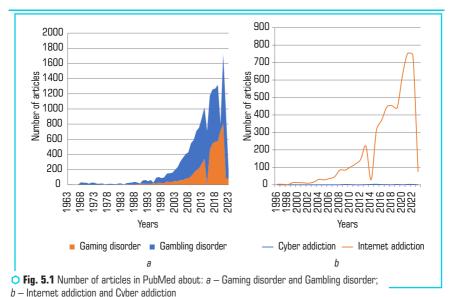
Richard A. Davis supplemented Young's definition, highlighted comorbidity, and showed that pathological use of the Internet could activate existing pathology or act as a separate type of addiction. Davis proposes a theoretical cognitive and behavioural model of pathological Internet use (PIU) [20].

He distinguished two categories of Internet use:

– Generalized Problematic Internet Use (GPIU) – a multidimensional overuse of the Internet itself not concerned with any specific online activity;

– Specific Problematic Internet Use (SPIU) – pathological indulgence into an online behaviour through a specific function and/or application.

Alex S. Hall and Jeffrey Parsons introduced a third term, Internet Addictive Behaviour (IAB). They agree that excessive use of the Internet can harm cognitive, behavioural and affective spheres, that is, affect a person's health, but they do not support a pathological aetiology of this problem [21]. Scientists present excessive use of the Internet as a "benign" disorder, which is seen as compensation for behavioural deficiencies in real life. It is believed that this pathology can be compensated due to cognitive-behavioural relationships. In the 21st century, the relevance of research on disorders associated with the excessive use of information resources and technical means is increasing, which is confirmed by the increase in the number of publications on these topics, which were indexed in PubMed (**Fig. 5.1**).
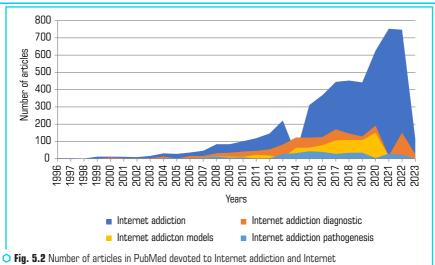
It is worth noting that since 2008, publications devoted to cyber addiction have constantly been appearing in the scientific literature. Cyber addiction is a new phenomenon that is more common among young people due to their high curiosity and frequent lack of time limit in the use of new technologies [22].

Fig. 5.1 Number of articles in PubMed about: *a* – Gaming disorder and Gambling disorder; *b* – Internet addiction and Cyber addiction

There are several common reasons that can lead to cyber addiction:

1. The need to escape from the real world: the Internet can become a way of avoiding real problems and responsibilities, which can lead to increased degradation of social and interpersonal skills.

2. Availability: the Internet is available to users anytime and anywhere. Unlimited access to a variety of content can lead to unhealthy addiction.

3. Social interaction: the Internet provides an opportunity to easily communicate with other people through social networks, forums and chat rooms. For some people, it becomes the main form of social interaction and sometimes even replaces normal communication in real life. This factor has become more relevant during the restrictive measures due to the COVID-19 pandemic.

4. A sense of success: the Internet can become a means of achieving success through virtual games, virtual communities, and entertainment. For some people, this becomes a motivation to continue spending a lot of time online.

5. Psychological factors: some people may use the Internet to avoid problems in real life and reduce anxiety, depression, loneliness or insecurity.

6. Information factors: the Internet is a limitless source of information, and some people may spend an inordinate amount of time searching for and consuming this information.

When analyzing research topics devoted to IA, it was found that the problem of pathogenesis and diagnosis is constantly being investigated by scientists, and the number of publications on this topic is constantly growing (**Fig. 5.2**). It is these studies that underlie the creation of various conceptual models of pathogenesis and the development of therapeutic strategies for IA.

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Fig. 5.2 Number of articles in PubMed devoted to Internet addiction and Internet addiction diagnosis

At the beginning of research into the phenomenon of Internet addiction, psychological models explaining their occurrence dominated. The cognitive-behavioural model of pathological use of the Internet by Richard A. Davis became the basis of cognitive-behavioural therapy for patients with IA [20].
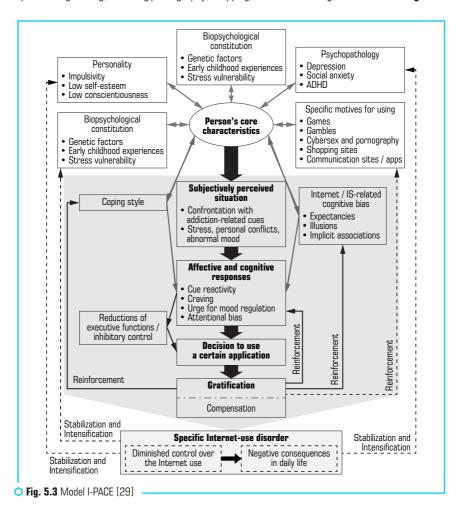
The theoretical foundation for the pharmacological treatment of IA became the medical-biological concepts based on biological and psychopathological studies. Three models have been described in which IA is viewed as an obsessive-compulsive disorder [23], an impulse control disorder [24], and/or an addictive disorder [25]. The most evident is the hypothesis according to which IA is considered a non-chemical addiction.

In pilot studies, it was established that pathological addiction to gambling (Gambling disorder) has similar biochemical features to addiction to psychoactive substances and other disorders characterized by impulsive features. According to the available data, norepinephrine is believed to be associated with arousal, dopamine with reward and reinforcing behaviour, serotonin with behavioural initiation and termination (or impulse control), and opioids with pleasure and urges.

The central place in disorders characterized by impaired impulse control is occupied by motivational neural pathways. A central component of motivational neural pathways is cortico-striatal-thalamo-cortical circuits, with more ventral components particularly important for impulsive and reward-oriented behaviours.

The biological hypothesis is confirmed by the revealed neurobiological correlates. The serotonin transporter gene (SS-5HTTLPR) polymorphism was found in Internet addicts [26]. Modern morphometric studies have revealed abnormalities of the white and grey matter of the brain in Internet addicts compared to the control group [27, 28].

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In 2016, Matthias Brand et al. proposed An Interaction of the Person-Affect-Cognition-Execution (I-PACE) model [29]. This model is based on the integration of data from psychological, psychopathological and neurobiological studies of pathological disorders related to the use of the Internet. Disorders related to the use of the Internet, without division into separate clinical variants, can be explained by the I-PACE (interaction of person-affect-cognition-performance) model. An example of such a disorder can be cyberbullying. The authors of this model proposed to describe the processes that underlie addiction when using certain Internet applications or sites, Internet games, in particular gambling, watching pornography, shopping, or communicating on the Internet (**Fig. 5.3**).

Fig. 5.3 Model I-PACE [29]

Motivation, satisfaction, achievement, and exploration are some of the psychological needs that drive video game addiction. These needs rely on other factors, such as competition, competence, persistence, creativity, and risk management, to keep a loyal game customer as long as possible, even with the potential for addiction [30].

There is currently a discussion on the formation of terminology to describe new non-chemical addictions associated with the use of computers/smartphones and the Internet.

Different types of Internet addiction are often distinguished and studied: compulsive web surfing; excessive virtual communication; gaming addiction (online or offline) — related and not related to gambling; compulsive shopping using the Internet; excessive watching of movies or listening to music; cybersexual addiction, phubbing, or "phone snubbing (insult)", i.e. using the phone during face-to-face communication, pathological upgrading of computers/smartphones. These options are not permanently reflected in modern classifications and are considered separately.

According to modern scientific research, conceptual developments and the I-PACE model, we propose to combine all the above-mentioned disorders into a single diagnostic taxon associated with the excessive use of modern communication technologies — cyber addiction. Our proposed diagnostic criteria for cyber addiction and a new tool for diagnosing cyber addiction — the Yuryeva-Shornikov Cyber Addiction Scale (YSCAS) will be described below.

5.2 MENTAL HEALTH PROBLEMS IN CYBER ADDICTION

Computer addicts experience distress in at least one of five areas: social, professional, educational, financial, and psychophysical. Mental health problems arise as a result of computer addiction and neglect of various aspects of life in exchange for virtual reality.

Among the negative consequences of human interaction with gadgets, socio-psychological and medical negative effects are distinguished. Among the social consequences, pronounced social, family, professional and educational maladjustment, financial problems and deviant forms of behaviour are most common. Among psychological problems, there are problems associated with deformations of the user's personal structure, a decrease in his intellectual abilities and a reduction in elementary school knowledge (use of functions "Spelling check", "mathematical operations"), a decrease in the flexibility of cognitive processes and clip thinking. But the most pathogenic are the medical consequences. Migraine-type headaches, back pain, conjunctivitis, numbness and pain in the fingers of the hand (carpal tunnel syndrome) are the most common among somato-neurological ones, and among psychiatric ones — cyber addiction, sleep disorders, depression and suicidal behaviour.

Cross-sectional studies indicate high comorbidity of Internet addiction and mental disorders [31].

A review of 20 studies correlating problematic internet use (PIU) and mental disorders found that 75 % reported significant correlations of PIU with depression, 57 % with anxiety, 100 % with symptoms of attention-deficit hyperactivity disorder (ADHD), 60 % with obsessive — compulsive symptoms, and 66 % with hostility or aggression. Comorbidity with Borderline personality disorder,

hypomania, and binge eating disorder is less common. People with internet video game addiction are especially likely to have underlying mental health disorders, such as depressive disorder, antisocial personality disorder, other addictions, ADHD and social phobia (agoraphobia).

With Internet addiction, there is a higher risk of addiction to psychoactive substances in adolescents. A significantly higher risk of drug addiction and alcoholism was revealed in young Internet addicts compared to healthy peers. Addicted users of online video games are more likely to use tobacco, alcohol, and cannabis [33]. It has been proven that the presence of Internet addiction can be a predictor of further use of psychoactive substances in adolescents [34].

In a representative sample of 4,957 10th-grade pupils in Istanbul, Turkey, it was found that male gender, substance use, depression, symptoms of attention deficit hyperactivity disorder, and lack of self-confidence predicted an increased risk of Internet addiction among 10th-grades Turkish pupils [35].

According to research data in Asia, among 2,500 college students, Internet addiction was found in 12.3 %, and alcohol addiction in 6.6 %. Often these addictions were combined, and in these cases, depression was most often diagnosed [36].

Adolescents with IA are also prone to suicidal thoughts, self-harm and delinquent behaviour [35]. A study by Patricia R. Recupero et al. proved that 11 % of suicides are the result of visiting pro-suicide sites. The risk group includes patients prone to depression and suicidal behaviour which use the Internet [37].

In patients with IA, short-term psychotic episodes during the period of abstinence have been described. In addition to the usual withdrawal symptoms such as agitation and irritability, the clinical presentation included persecutory delusions and disorganized behaviour. Psychosis was quickly stopped with atypical antipsychotics [38].

The issue of the relationship between cyber addiction and mental and behavioural disorders remains debatable. Do pathological disorders precede or result from IA? To clarify this question, Dong et al. examined the mental state of 59 students by Symptom Checklist-90 before and after the development of addiction [39].

They found that OCD symptoms were present in the study participants even before they became addicted to the Internet. After their addiction, significantly higher scores were observed for dimensions of depression, anxiety, hostility, interpersonal sensitivity, and psychoticism, suggesting that these were outcomes of Internet addiction disorder. An association between withdrawal syndrome, anxiety-depressive disorder, and future Internet addiction was found among South Korean men [40].

The presence of IA may predict a more successful treatment outcome in adults with depression, as IA may slow the process of symptom reduction and correlate with relapse [41].

Anxiety was found to be a predictor of Internet addiction, and Internet addiction was a significant predictor of depression. The results also showed that the relationship between Internet addiction and anxiety depends on gender. Male gender was found to be a significant predictor of Internet addiction [42].

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Based on the research of children aged 12–14 with mental disorders and computer addiction, Lyudmyla Yuryeva and Tetiana Bolbot identified primary and symptomatic computer addiction. They described the 3-stage clinical and psychopathological dynamics of the formation of computer addiction [43]. Their research shows symptomatic computer addiction occurs much more often than primary addiction. Based on the conducted clinical-psychopathological examination of patients with computer addiction, it was found that in 55 % of cases, symptomatic computer addiction in children was comorbid with socialized and non-socialized behaviour disorders, in 16 % – with organic anxiety disorder and organic personality disorder, in 11 % – with mild mental retardation. Before the formation of computer addiction, 8 % of the subjects were treated by a psychiatrist and 8 % by a neurologist. These children belong to the risk group of the formation of cyber addiction, and it is advisable for them to carry out screening diagnostics for the purpose of prevention and correction [44].

When carrying out preventive and corrective work among children and young people, it is important to convey information about the phenomenon of codependency to their loved ones and relatives.

Codependency is a psychological concept that describes the relationship between two people, one of whom has an addiction problem, and the other is trying to help him. In the case of cyber addiction, co-dependency may occur in family members or friends of a person with a cyber addiction problem.

In the case of cyber addiction, this can manifest itself in the fact that loved ones try to control the time a person spends on the Internet, forbid him to use a computer or mobile phone, and force him to go to therapy. However, such actions are not always beneficial, as they can make a person suffering from cyber addiction even more dependent on loved ones, reduce their independence and can reduce their motivation to fight addiction on their own.

To prevent codependency, it is important for the loved ones of a person with cyber addiction to maintain a balance between help and independence. They must provide assistance but must also take care of their own needs and health.

5.3 PROBLEMS OF CLINICAL DIAGNOSIS OF CYBER ADDICTION

The issue of recognizing IA as a nosological unit and including it in the classifications of mental disorders remains debatable.

In 2008, Jerald J. Block proposed to include Internet addiction in DSM-V [45]. He identified three subtypes of internet addiction (excessive gaming, sex addiction, email/texting addiction) and computer game addiction.

For all selected subtypes of IA, he proposed the following 4 criteria:

– excessive use of the Internet, often with a loss of sense of time or disregard for basic needs;

– withdrawal syndrome, including aggression, tension, and/or depression when the computer is unavailable;

— tolerance, including the need for better computer equipment, more computer programs, and increased time spent at the computer;

— negative consequences including arguments, lying, problems with learning and recreation, social isolation and fatigue.

Diagnostic criteria also include symptomatic criteria (seven clinical symptoms of Internet addiction), criteria for clinically significant disorders (functional and psychosocial), course criteria (duration of addiction for at least three months and use of the Internet for at least 6 hours a day, while the person is completely could do without it) and exclusion criteria (exclusion of addiction caused by mental disorders).

In 2010, Chinese researchers led by Ran Tao proposed their criteria for the diagnosis of Internet addiction, which are based on the DSM-5 criteria for chemical dependence [46].

Diagnostic criteria for Internet addiction:

1. Symptomatic criteria.

Both criteria must be present:

1) preoccupation with the Internet: the person constantly remembers previous Internet activity or anticipates the next Internet session;

2) withdrawal symptoms, as evidenced by dysphoria, anxiety, irritability, and boredom after several days without Internet use.

At least one (or more) of the following symptoms:

1) tolerance: the increase in time spent online that is necessary to achieve satisfaction;

2) persistent desire and/or unsuccessful attempts to control, reduce, or stop Internet use;

3) continued excessive use of the Internet despite knowledge of ongoing or recurrent physical or psychological problems that have been caused or exacerbated by Internet use;

4) loss of interest in previous hobbies and pastimes, with the exception of Internet use, as a direct result;

5) a person uses the Internet to avoid or relieve a bad mood (e.g., dysphoria, feelings of helplessness, guilt, anxiety);

6) exclusion criterion: excessive Internet use associated with psychiatric disorder or type I bipolar disorder.

2. Clinically significant criteria for violations: functional violations (reduction in social, scientific, educational, industrial activity), including loss of significant relationships, work, educational or career opportunities.

3. Temporal criteria: the duration of Internet addiction should be more than 3 months when using the Internet for 6 or more hours a day.

Korean experts also proposed diagnostic criteria for detecting IA in adolescents and college students [47, 48].

But due to the fact that the number of studies based on the standards of evidence-based medicine turned out to be insufficient, experts concluded that there are currently no grounds for including IA as a classification of mental disorders [33].

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In 2013, IA was not included in DSM-5, and in 2019 in ICD-11. Internet addiction was mentioned in the DSM-5 as a condition requiring further study, but it is not considered a mental disorder.

Modern classifications of disorders associated with excessive use of information resources and technical means are given in **Table 5.1** [49–51]. Among the disorders associated with excessive use of information resources and technical means, only two diagnostic taxon have been identified: Gambling disorder and Gaming disorder.

It should be noted that a new disease appears in ICD-11 — Gaming disorder, which is characterized by dependence on the process of games and not on excitement, as in Gambling disorder.

There are two variants of Gaming disorder: mainly online and mainly offline. This division significantly narrows the diagnosis of disorders related to the use of technical means and the Internet.

Proposed diagnostic criteria for cyber addiction.

To improve and unify the diagnosis of cyber addiction based on a single addictive theory, we propose the following diagnostic criteria, which are based on the criteria for the diagnosis of mental and behavioural disorders due to the use of psychoactive substances ICD-11 [49].

We see interaction with various information resources and technical means as the object of dependence. It is this approach that will not divide the single phenomenon of cyber addiction into dozens of sub-variants.

The main criteria for the diagnosis of cyber addiction include a model of repeated episodic or constant interaction with various information resources and technical means with signs of dysregulation of interaction with various information resources and technical means, which is manifested by one or more of the following signs:

— violation of control over interaction with various information resources and technical means (i.e., start, frequency, intensity, duration, termination, context of interaction);

— increasing the priority of interaction with various information resources and technical means over other aspects of life, including health maintenance, daily activities and responsibilities, so much so that interaction with various information resources and technical means continues or increases, despite causing harm or negative consequences (for example, repeated violations of relationships, especially family ones, professional or school consequences, negative effects on health).

Additional clinical characteristics:

— a subjective feeling of urge or desire (craving) to interact with various information resources and technical means often, but not always, accompanies the main signs of cyber addiction;

— tolerance (measured by the minimally comfortable duration or amount of time per day of interaction with various information resources and technical means) varies depending on individual factors (for example, history of use of psychoactive substances, genetics). With abstinence, the effects of tolerance diminish over time;

— individuals with certain co-occurring disorders or conditions (e.g., substance abuse, personality disorders) usually have reduced tolerance;

● **Table 5.1** Diagnostic criteria

Disease	ICD-10	DSM-5	ICD-11
Gambling disorder	The disorder consists of frequent, repeated episodes of gambling that dominate the patient's life to the detriment of social, occupational, material, and family values and commitments	A persistent pattern of gambling behaviour, which may be predominantly online (i.e., over the Internet or similar electronic networks) or offline, manifested by all of the following: – impaired control over gambling behaviour (e.g., onset, frequency, intensity, duration, termination, context); – increasing priority is given to gambling behaviour to the extent that gambling takes precedence over other life interests and daily activities; – continuation or escalation of gambling behaviour despite negative consequences (e.g., marital conflict due to gambling behaviour, repeated and substantial financial losses, negative impact on health). The pattern of gambling behaviour may be continuous or episodic or episodic and recurrent but is manifested over an extended period of time (e.g., 12 months). The gambling behaviour is not better accounted for by another mental disorder (e.g., Manic Episode) and is not due to the effects of a substance or medication. The pattern of gambling behaviour results in significant distress or impairment in personal, family, social, educational, occupational, or other important areas of functioning	A. Persistent and recurrent problematic gambling behaviour leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period: 1. Needs to gamble with increasing amounts of money in order to achieve the desired excitement. 2. Is restless or irritable when attempting to cut down or stop gambling. 3. Has made repeated unsuccessful efforts to control, cut back, or stop gambling. 4. Is often preoccupied with gambling (e.g., having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble). 5. Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed). 6. After losing money gambling often returns another day to get even ("chasing" one's losses). 7. Lies to conceal the extent of involvement with gambling. 8. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling. 9. Relies on others to provide money to relieve desperate financial situations caused by gambling. B. The gambling behavior is not better explained by a manic episode
Gaming disorder	—	—	A persistent pattern of gaming behaviour ('digital gaming' or 'video-gaming'), which may be predominantly online (i.e., over the Internet or similar electronic networks) or offline, manifested by all of the following: – impaired control over gaming behaviour (e.g., onset, frequency, intensity, duration, termination, context); – increasing priority is given to gaming behaviour to the extent that gaming takes precedence over other life interests and daily activities; – continuation or escalation of gaming behaviour despite negative consequences (e.g., family conflict due to gaming behaviour, poor scholastic performance, negative impact on health). The pattern of gaming behaviour may be continuous or episodic and recurrent but is manifested over an extended period of time (e.g., 12 months). The gaming behaviour is not better accounted for by another mental disorder (e.g., Manic Episode) and is not due to the effects of a substance or medication. The pattern of gaming behaviour results in significant distress or impairment in personal, family, social, educational, occupational, or other important areas of functioning

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— physical or mental health consequences (other than the core characteristics of cyber addiction) are commonly present in individuals with cyber addiction but are not required for the diagnosis. Similarly, functional impairment in one or more areas of life (e.g., work, household responsibilities, parenting) is commonly observed in individuals with cyber addiction but is not required for the diagnosis;

— individuals with cyber addiction have elevated rates of many other mental disorders, particularly those associated with high levels of anxiety. The specific pattern of combined occurrence depends on the characteristics of the patient's personality and reflects common risk factors and general cause-and-effect relationships;

— a model of interaction with various information resources and technical means, which includes frequent repetitions or a long time of interaction, is more common among certain subgroups (for example, teenagers). In such cases, peer group dynamics may contribute to the maintenance of cyber addiction. Regardless of the social contribution to behaviour, a pattern of interaction with various informational resources and technical means that conforms to subgroup norms should not be considered presumptive evidence of cyber addiction unless all diagnostic requirements for the disorder are met.

Limit with the norm (threshold):

— frequent interaction with various information resources and technical means does not automatically mean a diagnosis of cyber addiction. There should be evidence of signs of cyber addiction, such as a violation of control over the time of interaction with various information resources and technical means, an increased priority of interaction with various information resources and technical means over other life priorities or physiological features.

5.4 INSTRUMENTS FOR INTERNET ADDICTION EVALUATION

Over 30 years of studying IA in different countries of the world, many tools for its assessment have been developed, but the "gold standard" for the diagnosis and assessment of IA has not yet been created. In a large literature review of IA measurement tools, Stéphanie Laconi et al. identified 45 instruments that measure and assess IA through scales, interviews, or diagnostic criteria [52].

Among these instruments, not all have been properly validated, and their psychometric properties have not been investigated among different groups of users. Of the 45 instruments, only 17 had their psychometric characteristics evaluated more than once, and 10 had three or more evaluations. Other scales require further study before they can be used by researchers and clinicians as a tool to assess IA. According to Keith W. Beard and Aviv Weinstein and Michel Lejoyeux, the validity of these scales is questionable mainly due to the lack of definition for IA and its current grounding in multiple theoretical frameworks [53, 54].

Among the well-studied diagnostic tools used in scientific and practical activities, the following scales are most often used [55, 56].

The most frequently used is the Internet Addiction Test – IAT is based on the Internet Addiction Diagnostic Questionnaire – IADQ and assesses IA based on criteria for the diagnosis of pathological gambling. The IADQ is based on diagnostic criteria for compulsive gambling and alcoholism [19, 57].

The Internet Addiction Scale (IAS), which was created by Griffiths and validated by Laura A. Nichols and Richard Nicki and Fatih Canan et al. [58].

The Compulsive Internet Use Scale – CIUS was developed primarily on criteria for pathological gambling [59]. The Chen Internet Addiction Scale – CIAS is another questionnaire developed on criteria for pathological gambling and substance dependence [60]. The Online Cognition Scale – OCS is a questionnaire based on cognitive-behavioural theory [61]. The Generalized Problematic Internet Use Scale – GPIUS is another questionnaire based on cognitive-behavioural theory [62]. Examples of other IA instruments include the Problematic Internet Use Questionnaire – PIUQ [63], Problematic Internet Use Scale – PIUS [64], Computer and Internet Use – CIU [65], Problematic Internet Use Diagnostic-Interview – PIUD-I [24] and others.

In 2005, Ukrainian researchers Lyudmyla Yuryeva and Tetiana Bolbot had created a "Method of screening diagnostics of computer addiction". This method, unlike others, allows not only to diagnose of the state of addiction but also to identify a "risk group" with signs of computer addiction to apply effective preventive programs aimed at preventing the development of mental and behavioural disorders. The questionnaire consists of 11 questions. The answer is evaluated on a 4-point scale: 1 – never, 2 – rarely, 3 – often and 4 – very often [66] (**Table 5.2**).

Evaluation of the emotional state, volitional qualities, consumer aspects, abilities to control behaviour, and physical and psychological influences on the user, which are reflected in the questions using an extended range of adapted indicators of the symptoms of computer addiction, allows you to differentiate the initial data between the stages of "addiction", "hobbies" and "risk of occurrence" [43].

The results are evaluated based on the sum of points:

– up to 15 points – 0 % risk of developing computer addiction;

– 16–22 points – the stage of enthusiasm;

– 23–37 points – the risk of developing computer addiction (the need for preventive programs in the future);

– more than 38 points – presence of computer addiction.

The use of this method allows for effective screening and diagnostics of computer addiction both among individuals and in a group of gadget users, as well as at the same time assessing the emotional state of the individual, his volitional characteristics, the ability to self-control behavior, physical and psychological state.

In 2013–2015, an international study was conducted to compare the results of using three survey methods that are designed to diagnose Internet addiction: the Young's Internet Addiction Scale [19], Chen Internet Addiction Scale [60] and the method of screening diagnostics of computer addiction Lyudmyla Yuryeva and Tetiana Bolbot [66]. The results of the study showed that all correlations between respondents' answers are high, the scales are comparable, and the results obtained on any of the three scales can be compared [67].

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● **Table 5.2** Screening diagnostic scale of computer addiction by Lyudmyla Yuryeva and Tetiana Bolbot

Nº	Question	Never	Rarely	Often	Very often
1	How often do you feel invigorated, satisfied, or relieved when you are at the computer (being online)?				
2	How often do you foresee being at the computer (being online), thinking and reflecting on how you will find yourself at the computer, opening a certain site, finding certain information, and making new acquaintances?				
3	How often do you need to spend more and more time at the computer (being online) or spend more and more money in order to get the same sensations?				
4	How often do you manage to independently stop working at the computer (being online)?				
5	How often do you feel nervous, depressed, irritable, or empty when away from the computer (being offline)?				
6	How often do you feel the need to go back to the computer (being online) to improve your mood or get away from life's problems?				
7	How often do you neglect family, social responsibilities and studies due to frequent computer work (being online)?				
8	How often do you have to lie and hide from parents or teachers the amount of time spent on the computer (being online)?				
9	How often is there an actualization or threat of loss of friendly and/or family relationships, changes in financial stability, and academic success in connection with frequent work at the computer (being online)?				
10	How often do you notice physical symptoms, such as numbness and pain in your hand, back pain, dry eyes, headaches, neglect of personal hygiene, and eating near the computer?				
11	How often do you notice sleep disturbances or changes in sleep patterns in connection with frequent work at the computer (being online)?				

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5.5 YSCAS SCALE. A NEW INSTRUMENT FOR THE CYBER ADDICTION DIAGNOSIS

Existing tools for diagnosing Internet addiction no longer meet the times in their theoretical approaches, and do not fully reflect the problems of addicts. Between general Internet addiction and specific types of addictive Internet use (addiction to Internet games, social networks, cybersex, etc.) there are not only general features but also psychological and psychopathological differences.

The use of diagnostic methods focused on certain types of non-chemical addictions significantly narrows the diagnostic corridor and distorts statistical data on the prevalence of IA.

Based on these considerations, we developed a new psychodiagnostic tool based on the modern paradigm of cyber addiction. The YSCAS scale (Yuryeva-Shornikov Cyber Addiction Scale) can be a tool for diagnosing various types of Internet addiction. It is an 18-item self-report scale, each rated on a 5-point Likert scale from 1 (very rarely) to 5 (very often) [68]. The proposed scale allows you to detect cyber addiction and can be used as a screening method, after which you still need to consult a specialist in non-chemical addictions. High prognostic characteristics make it possible to detect addictive behaviour with a high degree of probability when interacting with various information resources and technical means.

When developing the YSCAS scale in 2020–2021, we conducted an assessment of the reliability of the questionnaire (psychometric reliability) and an assessment of validity. Psychometric reliability is based on two main criteria: internal consistency criteria of scale items and stability criteria (test-retest reliability). To determine the validity of the test, we investigated external, content, construct and criterion validity. In the first stage, we evaluated the internal consistency of the YSCAS scale, and external and content validity, at the second stage — stability, construct and criterion validity. To characterize the criterion validity of the YSCAS, we used the Chen Internet Addiction Scale (CIAS) and its subscales [60].

A study by Chih-Hung Ko et al. showed that the Chen Internet Addiction Scale has high predictive qualities in the diagnosis of gaming disorder according to the DSM-5 criteria: the optimal points for screening and diagnosis were 68 or more (sensitivity — 97.1 %; specificity — 76.8 %) and 72 or more (sensitivity — 85.5 %; specificity — 87.0 %) [69].

At the pilot testing stage, 116 people (39 men and 77 women) who were students at the Dnipro State Medical University (Ukraine) took part in the study. Age range — from 19 to 69 years. The main sample of respondents was represented by 101 people, of which 60 people participated in the study of the retest reliability of the questionnaire. In **Table 5.3** the general characteristics of the studied persons are shown.

● **Table 5.3** General characteristics of participants (Me[Q1;Q3])

Indicator	Value		
Study	Primary	Repeated	Total
Participants number	116	101	217
Proportion of men/women	39/77	27/74	66/151
Age	21 [20;34]	21 [20;45]	21 [20;40]
YSCAS	34 [28.5;41.5]	35 [30;40]	34 [29;42]
CIAS	–	44 [37;53]	44 [37;53]

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The normality of the distribution of features was assessed using the Shapiro-Wilk test. Internal consistency and homogeneity of the YSCAS scale were assessed using Cronbach's α coefficient and average correlation coefficients between scale items. The coefficient of internal consistency of the split test was also studied. A value of ≥ 0.70 was taken as the cut-off point of Cronbach's α coefficient, and 0.20 to 0.40 was considered an acceptable range of average correlation coefficients between items. Possible gender differences in the YSCAS total score were assessed using the Mann-Whitney test for unrelated groups. When assessing the stability (sensitivity) of the test, its repeatability was studied using the "test-retest" method with an interval of two weeks using the Wilcoxon W-test.

Since external and content validity were considered by the authors at the stage of question preparation, the validity analysis included an assessment of construct and criterion validity. The construct validity of the YSCAS questionnaire was tested by studying its structure using factor analysis. To characterize the criterion validity of the YSCAS, Spearman's correlation coefficients were calculated between the total score of this scale and the total score of the Chen Internet Addiction Scale (CIAS) and its subscales [60, 70].

In order to determine the diagnostic significance of the proposed test, a characteristic curve (ROC-curve) was constructed based on the values of sensitivity and specificity, which shows the dependence of the number of correctly diagnosed positive cases on the number of incorrectly diagnosed negative cases (X axis = specificity, Y axis = sensitivity) and is one of the methods of assessing model quality. To obtain the numerical value of the clinical significance of the test, the AUC (Area Under Curve) indicator was used – the area under the curve, which evaluates the quality of the model as follows: 0.9–1.0 – excellent, 0.8–0.9 – very good, 0.7–0.8 – good, 0.6–0.7 – average, 0.5–0.6 – unsatisfactory [71].

In all cases of hypothesis testing, $p < 0.05$ was considered a significant level of differences.

When assessing the internal consistency and homogeneity of the YSCAS scale using the α-Cronbach coefficient and the average correlation coefficients between the items of the scale as a whole. The average Cronbach's α was 0.840953, standardized – 0.855660, and the average correlation coefficient between scale items – 0.253627. Detailed Cronbach's α values for individual questions and the correlation between the question and the total score are given in the **Table 5.4**.

Also, in order to assess the internal consistency of the test, the test was evaluated using the splitting method (Split half reliability). The indicator of the coefficient of internal consistency of the test was obtained at the level of 0.8719 with a strong correlation between equal halves ($r_s = 0.7730$).

Evaluating the gender difference of the YSCAS scale using the Mann-Whitney test, the following results were obtained: U = 4865.00, $z = -0.2761$ with $p = 0.7823$, which indicates the absence of a gender difference in the total score of the YSCAS scale.
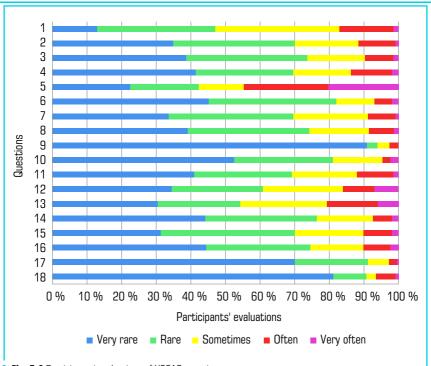
As shown in **Fig. 5.4**, the frequency distribution of answers to the questions corresponds to the expected results, with the exception of questions 5 and 9, however, according to the analysis of Cronbach's alpha (**Table 5.4**), the exclusion of these questions will not lead to a significant increase in the quality of the questionnaire.

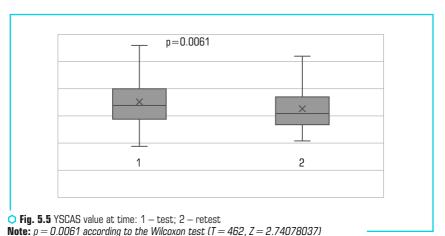● **Table 5.4** Evaluation of the internal consistency of the YSCAS scale

Question №	Correlation between question and total score	Alpha if removed
1	0.473534	0.831469
2	0.498949	0.830008
3	0.422908	0.833743
4	0.437342	0.833102
5	−0.050315	0.867160
6	0.474572	0.831420
7	0.619197	0.824429
8	0.646118	0.822805
9	0.450731	0.834427
10	0.403059	0.834673
11	0.336436	0.838198
12	0.311800	0.840688
13	0.625457	0.822149
14	0.492079	0.830451
15	0.591625	0.825526
16	0.676506	0.820607
17	0.498346	0.831753
18	0.324345	0.837966

The obtained data together indicate a high internal consistency and homogeneity of the questions of the proposed YSCAS scale.

To determine the stability of the indicators of the YSCAS scale, the assessment of the subjects was carried out twice with an interval of two weeks. The sums of points obtained with the help of the YSCAS scale decreased, which can be explained by the fact that certain respondents paid attention to the amount of time they spend using various gadgets and reduced it. To check the statistical reliability of these changes, the scores on the YSCAS questionnaire (test-retest) were compared with each other using the non-parametric Wilcoxon W-test, the calculation of which revealed a high reliability of differences ($p = 0.0061$) (**Fig. 5.5**). However, the calculation of Cohen's d revealed that the obtained effect of changes is small ($d = -0.248$ (95 % CI 0.683, −0.038)), which allows us to ignore the decrease in the total score after two weeks. Spearman's correlation coefficient, which reflects the retest reliability of the YSCAS was $r_s = 0.7464$ ($p < 0.001$), which indicates a very strong relationship between the results of repeated assessments of the examined.

Fig. 5.4 Participants' evaluations of YSCAS questions

Fig. 5.5 YSCAS value at time: 1 – test; 2 – retest
Note: *p = 0.0061 according to the Wilcoxon test (T = 462, Z = 2.74078037)*

Criterion validity was assessed using Spearman's correlation coefficient between YSCAS and Chen's Internet Addiction Scale (CIAS), which was $r_s = 0.8044$ ($p < 0.001$). The limit value of this parameter is most often considered $r_s = 0.8$ [72].

The obtained results indicate high criterion validity, that is, both the proposed scale and the CIAS test measure the same phenomena.

From the data given in **Table 5.5**, it follows that the YSCAS total score among the subscales of the CIAS test correlates more strongly with the core symptoms of Internet addiction than with problems related to Internet addiction. The data of the study of construct validity explain this. Using factor analysis, we did not find internal factors that would act as subscales. According to the rocky embankment criterion (**Fig. 5.6**), a sufficient number of factors in the YSCAS scale is 2, but **Table 5.6** shows that even using a four-factor model will explain only 53.8 % of the variance. None of the orthogonal rotations of the factors led to an increase in the cumulative percentage. Thus, the proposed YSCAS scale should be considered as a single factor, which does not have subscales in its structure.

● **Table 5.5** Rank correlation coefficients of the YSCAS scale with CIAS subscales

Symptom	Com	Wit	Tol	IH	TM	IA-Sym	IA-RP
YSCAS	0.687	0.732	0.587	0.652	0.607	0.800	0.686

Note: *Com – compulsive symptoms; Wit – withdrawal symptoms; Tol – symptoms of tolerance;*
IH – intrapersonal problems and health problems; TM – problems with time management;
IA-Sym – key symptoms of Internet addiction, IA-RP – problems related to Internet addiction
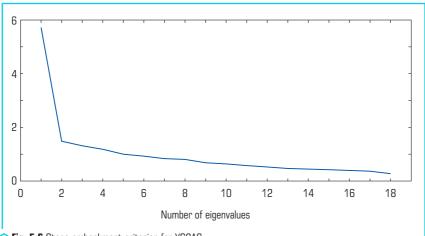
● **Table 5.6** Variance analysis of the YSCAS scale

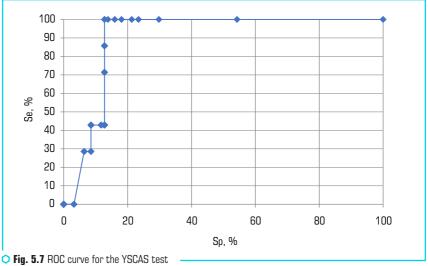| Factors	Dispersions	% of the total variance	Cumulative variance	Cumulative %
1	5.719459	31.77477	5.719459	31.77477
2	1.474328	8.19071	7.193787	39.96548
3	1.312862	7.29368	8.506649	47.25916
4	1.180317	6.55732	9.686966	53.81648

The quality of the YSCAS model was analyzed using ROC analysis. The resulting area under the curve (AUC) was 0.971 (95 % CI 0.88, 1.0), which characterizes the excellent quality of the model (**Fig. 5.7**). In our work, the threshold value of the total risk scale (cut off) was 47 points. The studied indicator had a sensitivity (Se) of 100.0 % and a specificity (Sp) of 90.4 %.

Since the obtained results indicate the presence of cyber addiction with a YSCAS test result of 47 or more points, we offer the following gradation of results: 18–33 points – no addiction, 33–46 points – a tendency to addiction, and 47 or more points – present cyber addiction.

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As a result of the approbation of the proposed psychodiagnostic technique "Yuryeva-Shornikov Cyber Addiction Scale" (**Table 5.7**), it was established that this psychodiagnostic tool is a reliable and valid method of diagnosing cyber addiction. The results of our work confirm the psychometric reliability of the proposed YSCAS test, high construct and criterion validity.

Fig. 5.6 Stone embankment criterion for YSCAS

Fig. 5.7 ROC curve for the YSCAS test

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● **Table 5.7** Yuryeva–Shornikov Cyber Addiction Scale – YSCAS

Nº	Statement	Very rarely	Rarely	Regularly / from time to time	Often	Very often
1	How often do you feel invigorated, satisfied, or relieved when you are online?					
2	How often do you anticipate being online when you are offline?					
3	How often do you notice that you need to spend more and more time online?					
4	How often do you spend time online instead of sleeping?					
5	How often do you manage to stop your online activity on your own?					
6	How often do you feel irritable, depressed, and empty when offline or without gadgets?					
7	How often do you feel the need to go online to improve your mood or get away from problems?					
8	How often do you neglect family, community responsibilities and studies due to frequent online presence?					
9	How often do you have to lie to family members or others about the amount of time you spend online?					
10	How often do people say that you spend too much time online?					
11	How often do you notice physical symptoms, such as numbness and pain in the wrists, pain in the back and neck, dry eyes?					
12	How often do you notice sleep disturbances or changes in sleep patterns?					
13	When online, how often do you find yourself saying, "Just a few more minutes, and that is it"?					
14	How often do you choose the Internet over face-to-face communication?					
15	How often does using the Internet decrease your ability to work and/or your efficiency?					
16	How often does it happen to you that you want to reduce the amount of time you spend online, but nothing works?					
17	How often do you try to hide the amount of time you spend online?					
18	How often do you think you should get help for coping with the Internet?					

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Calculation of points.

For questions 1–4 and 6–18: very rarely – 1 point, rarely – 2 points, regularly / from time to time – 3 points, often – 4 points, very often – 5 points.
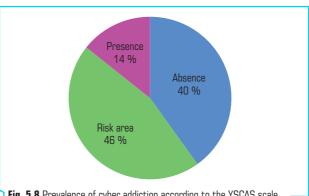
In question 5 – reverse calculation of points: very rarely – 5 points, rarely – 4 points, regularly / from time to time – 3 points, often – 2 points, very often – 1 point.

Results:

– 18–32 points – no addiction;

– 33–46 points – a tendency towards addiction;

– 47 or more points – cyber addiction is present.

In a clinical study of the YSCAS scale, it was established that the Spearman correlation coefficient between the YSCAS indicators and Chen's Internet addiction scale was $r_s = 0.8044$ ($p < 0.001$), which indicates high criterion validity. Evaluating the construct validity, it was established that the YSCAS scale should be considered as a single factor, which does not have subscales in its structure. The proposed method of diagnosing cyber addiction showed a high quality of the predictive model using ROC analysis: the area under the curve (AUC) was 0.971 (95 % CI 0.88, 1.0). The sensitivity of the scale was 100.0 % with a specificity of 90.4 %.

Analyzing our own data, we note that among 217 examined persons aged 19 to 69, the median score on the scale was 34 (29; 42) points. The prevalence of cyber addiction was 14.3 %, while 45.6 % of respondents were in the risk zone (**Fig. 5.8**). The obtained indicators are significantly higher than the results of the meta-analysis by Yuan-Chien Pan et al., according to which the prevalence of Internet addiction is 7.02 % (95 % CI 6.09–8.08 %), and the prevalence of Internet gaming is 2.47 % (95 % CI 1.46–4.16 %). This is explained by excellent approaches in diagnostics: Yuan-Chien Pan et al. separate Internet Gaming disorder from Internet addiction, then the proposed scale distinguishes all manifestations of addictive behaviour associated with interaction with various information resources and technical means [73].

○ **Fig. 5.8** Prevalence of cyber addiction according to the YSCAS scale

Comparing our data with the results of the study by Ameena M. Al Mukhaini et al., who investigated Internet addiction among those who studied at a residency in Oman, it is possible to assert the similarity of the obtained data. Thus, in Oman, 37.3 % of residents were addicted to the Internet; moreover, among those addicted, 36.2 % had depression [74].

As a perspective for further research, it is possible to conduct additional studies to assess the factorial validity of the scale in samples of conditionally healthy individuals and in heterogeneous clinical samples using factor analysis.

CONCLUSION

Analysis of the dynamics of the study of the problem of cyber addiction and a review of modern research on this topic shows that in recent decades, the efforts of researchers have been directed to the study of its genesis, the creation of conceptual models, and the search for effective methods of diagnosis and treatment. However, it should be noted that despite the 30-year history of research into this phenomenon, scientists have not been able to reach a consensus on definitions, clinical and psychometric tools for the diagnosis and classification of Internet addiction behaviour. To date, only Gambling Disorder and Gaming Disorder are represented as diagnostic taxa in mental disorder classifications. This significantly narrows the diagnostic possibilities of detecting Internet risky behaviour, especially at the first stages of its development, which is very important not only for its timely prevention and correction, but also for the prevention of mental and behavioural disorders comorbid with it.

According to modern scientific studies, conceptual developments and the I-PACE model, we propose to combine all variants of Internet addiction, which are not consistently reflected in modern classifications and are considered separately (phubbing, obsessive web surfing; telephone snubbing, excessive virtual communication; cybersexual addiction and others) into a single diagnostic taxon associated with excessive use of modern communication technologies and call it cyber addiction. The selection of a single definition of "cyber addiction" is based on the fact that we see interaction with various information resources and technical means as the object of addiction. It is this approach that will not divide the single phenomenon of cyber addiction into dozens of sub-variants.

In order to improve and unify the diagnosis of cyber addiction and based on a single addictive theory, we proposed clinical diagnostic criteria based on the criteria for the diagnosis of mental and behavioural disorders due to the use of psychoactive substances ICD-11. We have highlighted and described the main and additional clinical characteristics of cyber addiction and provided characteristics of the boundary with normative behaviour when using various information resources and technical means.

Due to the fact that the existing tools for diagnosing various variants of Internet addiction do not fully correspond to our proposed definition of cyber addiction and cannot be used for its screen-

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ing, we developed a new psychodiagnostic tool based on the modern paradigm of cyber addiction. The YSCAS (Yuryeva-Shornikov Cyber Addiction Scale) is an 18-item self-report scale, each rated on a 5-point Likert scale from 1 (very rarely) to 5 (very often). The proposed scale allows detecting cyber addiction and can be used as a screening method.

In a clinical study of the YSCAS scale, it was established that the Spearman correlation coefficient between the YSCAS indicators and Chen's Internet addiction scale was $r_s = 0.8044$ ($p < 0.001$), which indicates high criterion validity. Evaluating the construct validity, it was established that the YSCAS scale should be considered as a single factor, which does not have subscales in its structure. The proposed method of diagnosing cyber addiction showed a high quality of the predictive model using ROC analysis: the area under the curve (AUC) was 0.971 (95 % CI 0.88, 1.0). The sensitivity of the scale was 100.0 % with a specificity of 90.4 %.

High prognostic characteristics make it possible to detect addictive behaviour with a high degree of probability when interacting with various information resources and technical means.

Our proposed new approach to the phenomenon of cyber addiction, clinical diagnostic criteria for cyber addiction and the new screening psychometric tool in the diagnosis of cyber addiction YSCAS will allow to unify the diagnosis of various variants of addiction states, carry out their early screening diagnosis, identify risk groups and carry out timely preventive and corrective work.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

REFERENCES

1. Kuss, D. J., Lopez-Fernandez, O. (2016). Internet addiction and problematic Internet use: A systematic review of clinical research. World Journal of Psychiatry, 6 (1), 143–176. doi: https://doi.org/10.5498/wjp.v6.i1.143

2. Petrosyan, A. (2023). Internet and social media users in the world 2023. Statista. Available at: https://www.statista.com/statistics/617136/digital-population-worldwide/

3. Bindé, J., Matsuura, K. (Eds.) (2005). Towards knowledge societies. UNESCO Pub, 237.

4. Yuryeva, L. N. (2014). Kompiuternaia zavisimost-addiktciia obshchestva, osnovannogo na znaniiakh. Tiumenskii Meditcinskii Zhurnal, 16 (1), 54–55.

5. Yuryeva, L. N. (2015). Formirovanie kiberkultury: Ot klinopisi k Internetu. Novosti Meditciny i Farmatcii, 15 (558), 20–21.

6. Maruta, N. O., Yuryeva, L. M. (Ed.) (2022). Okhorona psykhichnoho zdorov'ia. Strokov D. V.

7. Young, K., Pistner, M., O'Mara, J., Buchanan, J. (1999). Cyber Disorders: The Mental Health Concern for the New Millennium. CyberPsychology & Behavior, 2 (5), 475–479. doi: https://doi.org/10.1089/cpb.1999.2.475

8. Orzack, M. H. (1999). Cyberkids: Overdosing on computers? FCD Update, 4, 1.

9. Chakraborty, K., Basu, D., Vijaya Kumar, K. G. (2010). Internet addiction: Consensus, controversies, and the way ahead. East Asian Archives of Psychiatry, 20 (3), 123–132.

10. Weinstein, A. (2015). Comorbidity of Internet addiction with other psychiatric conditions. Journal of Behavioral Addictions, 4 (S1), 43–44.

11. Christakis, D. A., Moreno, M. M., Jelenchick, L., Myaing, M. T., Zhou, C. (2011). Problematic internet usage in US college students: a pilot study. BMC Medicine, 9 (1). doi: https://doi.org/10.1186/1741-7015-9-77

12. Poli, R., Agrimi, E. (2011). Internet addiction disorder: Prevalence in an Italian student population. Nordic Journal of Psychiatry, 66 (1), 55–59. doi: https://doi.org/10.3109/08039488.2011.605169

13. Park, S., Jeon, H. J., Bae, J. N., Seong, S. J., Hong, J. P. (2017). Prevalence and Psychiatric Comorbidities of Internet Addiction in a Nationwide Sample of Korean Adults. Psychiatry Investigation, 14 (6), 879–882. doi: https://doi.org/10.4306/pi.2017.14.6.879

14. Xu, J., Shen, L., Yan, C., Hu, H., Yang, F., Wang, L. et al. (2012). Personal characteristics related to the risk of adolescent internet addiction: a survey in Shanghai, China. BMC Public Health, 12 (1). doi: https://doi.org/10.1186/1471-2458-12-1106

15. Starcevic, V. (2013). Is Internet addiction a useful concept? Australian & New Zealand Journal of Psychiatry, 47 (1), 16–19. doi: https://doi.org/10.1177/0004867412461693

16. Lin, X., Su, W., Potenza, M. N. (2018). Development of an Online and Offline Integration Hypothesis for Healthy Internet Use: Theory and Preliminary Evidence. Frontiers in Psychology, 9. doi: https://doi.org/10.3389/fpsyg.2018.00492

17. Marks, I. (1990). Behavioural (non-chemical) addictions. Addiction, 85 (11), 1389–1394. doi: https://doi.org/10.1111/j.1360-0443.1990.tb01618.x

18. Goldberg, I. (1996). Internet addiction disorder. CyberPsychol. Behavior, 3 (4), 403–412.

19. Young, K. S. (1998). Internet Addiction: The Emergence of a New Clinical Disorder. CyberPsychology & Behavior, 1 (3), 237–244. doi: https://doi.org/10.1089/cpb.1998.1.237

20. Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. Computers in Human Behavior, 17 (2), 187–195. doi: https://doi.org/10.1016/s0747-5632(00)00041-8

21. Hall, A. S., Parsons, J. (2001). Internet addiction: College student case study using best practices in cognitive behavior therapy. Journal of Mental Health Counseling, 23 (4), 312–328.

22. Sánchez Palacios, B. I., Zambrano Vera, G. (2020). La ciberadicción en el rendimiento académico de los estudiantes de educación básica superior de la escuela Cicerón Robles Velásquez, 2019. Caribeña de Ciencias Sociales, agosto, Article agosto. Available at: https://www.eumed.net/rev/caribe/2020/08/ciberadiccion.html

CHAPTER 5

23. Grant, J. E., Potenza, M. N., Weinstein, A., Gorelick, D. A. (2010). Introduction to Behavioral Addictions. The American Journal of Drug and Alcohol Abuse, 36 (5), 233–241. doi: https://doi.org/10.3109/00952990.2010.491884

24. Beard, K. W., Wolf, E. M. (2001). Modification in the Proposed Diagnostic Criteria for Internet Addiction. CyberPsychology & Behavior, 4 (3), 377–383. doi: https://doi.org/10.1089/109493101300210286

25. Fisoun, V., Floros, G., Siomos, K., Geroukalis, D., Navridis, K. (2012). Internet Addiction as an Important Predictor in Early Detection of Adolescent Drug Use Experience – Implications for Research and Practice. Journal of Addiction Medicine, 6 (1), 77–84. doi: https://doi.org/10.1097/adm.0b013e318233d637

26. Lee, Y. S., Han, D. H., Yang, K. C., Daniels, M. A., Na, C., Kee, B. S., Renshaw, P. F. (2008). Depression like characteristics of 5HTTLPR polymorphism and temperament in excessive internet users. Journal of Affective Disorders, 109 (1-2), 165–169. doi: https://doi.org/10.1016/j.jad.2007.10.020

27. Lin, F., Zhou, Y., Du, Y., Qin, L., Zhao, Z., Xu, J., Lei, H. (2012). Abnormal White Matter Integrity in Adolescents with Internet Addiction Disorder: A Tract-Based Spatial Statistics Study. PLoS ONE, 7 (1), e30253. doi: https://doi.org/10.1371/journal.pone.0030253

28. Zhou, Y., Lin, F., Du, Y., Qin, L., Zhao, Z., Xu, J., Lei, H. (2011). Gray matter abnormalities in Internet addiction: A voxel-based morphometry study. European Journal of Radiology, 79 (1), 92–95. doi: https://doi.org/10.1016/j.ejrad.2009.10.025

29. Brand, M., Young, K. S., Laier, C., Wölfling, K., Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An Interaction of Person-Affect-Cognition-Execution (I-PACE) model. Neuroscience & Biobehavioral Reviews, 71, 252–266. doi: https://doi.org/10.1016/j.neubiorev.2016.08.033

30. Shaikh, B., Jumain, R. S. A. (2014). Grounded Theory of Consumer Loyalty, a Perspective through Video Game Addiction. International Journal of Economics and Management Engineering, 8 (5), 1542–1544.

31. Weinstein, A., Curtiss Feder, L., Rosenberg, K. P., Dannon, P.; Rosenberg, K. P., Feder, L. C. (Eds.) (2014). Chapter 5 – Internet Addiction Disorder: Overview and Controversies. Behavioral Addictions. Academic Press, 99–117. doi: https://doi.org/10.1016/B978-0-12-407724-9.00005-7

32. Carli, V., Durkee, T., Wasserman, D., Hadlaczky, G., Despalins, R., Kramarz, E. et al. (2012). The Association between Pathological Internet Use and Comorbid Psychopathology: A Systematic Review. Psychopathology, 46 (1), 1–13. doi: https://doi.org/10.1159/000337971

33. Van Rooij, A. J., Kuss, D. J., Griffiths, M. D., Shorter, G. W., Schoenmakers, T. M., van de Mheen, D. (2014). The (co-)occurrence of problematic video gaming, substance use, and psychosocial problems in adolescents. Journal of Behavioral Addictions, 3 (3), 157–165. doi: https://doi.org/10.1556/jba.3.2014.013

CHAPTER 5

34. Rücker, J., Akre, C., Berchtold, A., Suris, J.-C. (2015). Problematic Internet use is associated with substance use in young adolescents. Acta Paediatrica, 104 (5), 504–507. doi: https://doi.org/10.1111/apa.12971

35. Evren, C., Dalbudak, E., Evren, B., Demirci, A. C. (2014). High risk of Internet addiction and its relationship with lifetime substance use, psychological and behavioral problems among 10(th) grade adolescents. Psychiatria Danubina, 26 (4), 330–339.

36. Yen, C., Tang, T., Yen, J., Lin, H., Huang, C., Liu, S., Ko, C. (2008). Symptoms of problematic cellular phone use, functional impairment and its association with depression among adolescents in Southern Taiwan. Journal of Adolescence, 32 (4), 863–873. doi: https://doi.org/10.1016/j.adolescence.2008.10.006

37. Recupero, P. R., Harms, S. E., Noble, J. M. (2008). Googling Suicide. The Journal of Clinical Psychiatry, 69 (6), 878–888. doi: https://doi.org/10.4088/jcp.v69n0601

38. Paik, A., Oh, D., Kim, D. (2014). A Case of Withdrawal Psychosis from Internet Addiction Disorder. Psychiatry Investigation, 11 (2), 207. doi: https://doi.org/10.4306/pi.2014.11.2.207

39. Dong, G., Lu, Q., Zhou, H., Zhao, X. (2011). Precursor or Sequela: Pathological Disorders in People with Internet Addiction Disorder. PLoS ONE, 6 (2), e14703. doi: https://doi.org/10.1371/journal.pone.0014703

40. Cho, S.-M., Sung, M.-J., Shin, K.-M., Lim, K. Y., Shin, Y.-M. (2012). Does Psychopathology in Childhood Predict Internet Addiction in Male Adolescents? Child Psychiatry & Human Development, 44 (4), 549–555. doi: https://doi.org/10.1007/s10578-012-0348-4

41. Zhou, J., Friedel, M., Rosmarin, D. H., Pirutinsky, S. (2023). Internet Addiction and the Treatment of Depression? A Prospective Naturalistic Outcome Study. Cyberpsychology, Behavior, and Social Networking, 26 (2), 121–126. doi: https://doi.org/10.1089/cyber.2022.0184

42. Xie, X., Cheng, H., Chen, Z. (2023). Anxiety predicts internet addiction, which predicts depression among male college students: A cross-lagged comparison by sex. Frontiers in Psychology, 13. doi: https://doi.org/10.3389/fpsyg.2022.1102066

43. Yuryeva, L. N., Bolbot, T. Yu. (2006). Kompiuternaia zavisimost: Formirovanie, diagnostika, kor rektciia i profilaktika. Porogi, 196.

44. Yuryeva, L. N., Bolbot, T. Yu., Nosov, S. H. (2004). Sluchai symptomatycheskoi kompiuternoi zavysymosty u patsyenta s orhanycheskym porazhenyem tsentralnoi nervnoi systemi. Arkhiv Psykhiatrii, 10 (3 (38)), 134–138.

45. Block, J. J. (2008). Issues for DSM-V: Internet Addiction. American Journal of Psychiatry, 165 (3), 306–307. doi: https://doi.org/10.1176/appi.ajp.2007.07101556

46. Tao, R., Huang, X., Wang, J., Zhang, H., Zhang, Y., Li, M. (2010). Proposed diagnostic criteria for internet addiction. Addiction, 105 (3), 556–564. doi: https://doi.org/10.1111/j.1360-0443.2009.02828.x

47. Ko, C.-H., Yen, J.-Y., Chen, S.-H., Yang, M.-J., Lin, H.-C., Yen, C.-F. (2009). Proposed diagnostic criteria and the screening and diagnosing tool of Internet addiction in college students. Comprehensive Psychiatry, 50 (4), 378–384. https://doi.org/10.1016/j.comppsych.2007.05.019

CHAPTER 5

48. Ko, C.-H., Yen, J.-Y., Chen, C.-C., Chen, S.-H., Yen, C.-F. (2005). Proposed Diagnostic Criteria of Internet Addiction for Adolescents. The Journal of Nervous and Mental Disease, 193 (11), 728–733. doi: https://doi.org/10.1097/01.nmd.0000185891.13719.54

49. ICD-11 for Mortality and Morbidity Statistics (2021). WHO. International classification of diseases. Available at: https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f499894965

50. Nuller, Yu. L., Tsyrkyn, S. Yu. (Eds.) (1994). Mezhdunarodnaia klassyfykatsyia boleznei (10-i peresmotr). Klassyfykatsyia psykhycheskykh y povedencheskykh rasstroistv. Klynycheskye opysanyia y ukazanyia po dyahnostyke. Adys.

51. Diagnostic and Statistical Manual of Mental Disorders (2013). American Psychiatric Association. doi: https://doi.org/10.1176/appi.books.9780890425596

52. Laconi, S., Rodgers, R. F., Chabrol, H. (2014). The measurement of Internet addiction: A critical review of existing scales and their psychometric properties. Computers in Human Behavior, 41, 190–202. doi: https://doi.org/10.1016/j.chb.2014.09.026

53. Beard, K. W. (2005). Internet Addiction: A Review of Current Assessment Techniques and Potential Assessment Questions. CyberPsychology & Behavior, 8 (1), 7–14. doi: https://doi.org/10.1089/cpb.2005.8.7

54. Weinstein, A., Lejoyeux, M. (2010). Internet Addiction or Excessive Internet Use. The American Journal of Drug and Alcohol Abuse, 36 (5), 277–283. doi: https://doi.org/10.3109/00952990.2010.491880

55. Mihajlov, M., Vejmelka, L. (2017). Internet addiction: a review of the first twenty years. Psychiatria Danubina, 29 (3), 260–272. doi: https://doi.org/10.24869/psyd.2017.260

56. Weinstein, A. (2015). Internet Addiction: Diagnosis, comorbidity and treatment. Meditsinskaya psikhologiya v Rossi, 4 (33), 3.

57. Young, K. S. (1998). Caught in the net: How to recognize the signs of Internet addiction--and a winning strategy for recovery. J. Wiley.

58. Nichols, L. A., Nicki, R. (2004). Development of a Psychometrically Sound Internet Addiction Scale: A Preliminary Step. Psychology of Addictive Behaviors, 18 (4), 381–384. doi: https://doi.org/10.1037/0893-164x.18.4.381

59. Meerkerk, G.-J., Van Den Eijnden, R. J. J. M., Vermulst, A. A., Garretsen, H. F. L. (2009). The Compulsive Internet Use Scale (CIUS): Some Psychometric Properties. CyberPsychology & Behavior, 12 (1), 1–6. doi: https://doi.org/10.1089/cpb.2008.0181

60. Chen, S.-H., Weng, L.-J., Su, Y.-J., Wu, H.-M., Yang, P.-F. (2003). Development of a Chinese Internet Addiction Scale and Its Psychometric Study. Chinese Journal of Psychology, 45 (3), 279–294.

61. Davis, R. A., Flett, G. L., Besser, A. (2002). Validation of a New Scale for Measuring Problematic Internet Use: Implications for Pre-employment Screening. CyberPsychology & Behavior, 5 (4), 331–345. doi: https://doi.org/10.1089/109493102760275581

CHAPTER 5

62. Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being: development of a theory-based cognitive-behavioral measurement instrument. Computers in Human Behavior, 18 (5), 553–575. doi: https://doi.org/10.1016/s0747-5632(02)00004-3

63. Demetrovics, Z., Szeredi, B., Rózsa, S. (2008). The three-factor model of Internet addiction: The development of the Problematic Internet Use Questionnaire. Behavior Research Methods, 40 (2), 563–574. doi: https://doi.org/10.3758/brm.40.2.563

64. Morahan-Martin, J., Schumacher, P. (2000). Incidence and correlates of pathological Internet use among college students. Computers in Human Behavior, 16 (1), 13–29. doi: https://doi.org/10.1016/s0747-5632(99)00049-7

65. Pratarelli, M. E., Browne, B. L. (2002). Confirmatory Factor Analysis of Internet Use and Addiction. CyberPsychology & Behavior, 5 (1), 53–64. doi: https://doi.org/10.1089/109493102753685881

66. Yuryeva, L. M., Bolbot, T. Yu. (2005). Pat. No. 72366. Method of screening diagnostics for detecting computer dependence. MPK: G09B 3/00. published: 15.02.2005. Available at: https://uapatents.com/3-72366-sposib-skriningovo-diagnostiki-kompyuterno-zalezhnosti.html

67. Voiskunskii, A., Mitina, O., Guseinova, A., Rustamova, N. (2015). Measurement of Internet addiction: Comparison of diagnostic methods. Meditsinskaya psikhologiya v Rossi, 4 (33), 11.

68. Yuryeva, L., Shornikov, A. (2021). A new instrument for the cyberaddiction diagnosis. Ukrains'kyi Visnyk Psykhonevrolohii, 29 (3 (108)), 57–62. doi: https://doi.org/10.36927/2079-0325-v29-is3-2021-11

69. Ko, C.-H., Chen, S.-H., Wang, C.-H., Tsai, W.-X., Yen, J.-Y. (2019). The Clinical Utility of the Chen Internet Addiction Scale — Gaming Version, for Internet Gaming Disorder in the DSM-5 among Young Adults. International Journal of Environmental Research and Public Health, 16 (21), 4141. doi: https://doi.org/10.3390/ijerph16214141

70. Malygin, V. L., Feklisov, K. A., Iskandirova, A. B., Antonenko, A. A. (2011). Metodologicheskie podkhody k rannemu vyiavleniiu Internet-zavisimogo povedeniia. Meditcinskaia Psikhologiia v Rossii, 6.

71. Grigoryev, S. G., Lobzin, Yu. V., Skripchenko, N. V. (2016). The role and place of logistic regression and roc analysis in solving medical diagnostic task. Journal Infectology, 8 (4), 36–45. doi: https://doi.org/10.22625/2072-6732-2016-8-4-36-45

72. Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., Young, S. L. (2018). Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. Frontiers in Public Health, 6. doi: https://doi.org/10.3389/fpubh.2018.00149

73. Pan, Y.-C., Chiu, Y.-C., Lin, Y.-H. (2020). Systematic review and meta-analysis of epidemiology of internet addiction. Neuroscience & Biobehavioral Reviews, 118, 612–622. doi: https://doi.org/10.1016/j.neubiorev.2020.08.013

74. Al Mukhaini, A. M., Al Houqani, F. A., Al Kindi, R. M. (2021). Internet Addiction and Depression Among Postgraduate Residents. Sultan Qaboos University Medical Journal, 21 (3), 408–415. doi: https://doi.org/10.18295/squmj.4.2021.008

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