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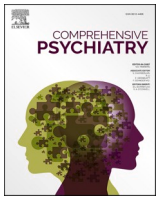

Symptoms and functional impairments in patients with Internet Use Disorders participating in an online short-term therapy

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ABSTRACT

Background: Internet use disorders (IUD) have been recognized as a serious mental health concern. In order to promote consensus on core features of IUD, further studies involving clinical samples are required.
Aims: A clinical evaluation of patients with IUD was conducted as part of the scientific monitoring of a novel online short-term therapy, embedded in the randomized controlled trial Stepped Care Approach for Problematic Internet use Treatment (SCAPIT; ID: DRKS00025994).
Methods: An online diagnostic and a clinical assessment were performed at the baseline measurement of the online intervention. The self-report version of the Assessment of Internet and Computer Game Addiction (AICA-S) was applied to assess symptom severity of IUD. The impact of psychopathological symptoms and impairments of functioning on IUD symptomatology was examined in the sample of patients. Based on a dichotomous classification of the symptom severity of IUD, differences among participants presenting moderate compared to severe addictive Internet behavior were analyzed.
Results: The sample of this an analysis consisted of 57 patients (57.9% males, mean age of 29.12 years) participating in the online short-term therapy for IUD. Based on the AICA-S sum score (M = 11.60; SD = 3.30) participants exhibited moderate (n = 44; 77.2%) to severe (n = 13; 22.8%) symptoms of addictive Internet use. Psychopathological symptoms and impairments of psychosocial functioning had an effect on symptom severity of IUD. Participants with severe symptoms of IUD showed higher psychopathological strains compared to patients with moderate addictive Internet behavior.
Conclusions: The clinical evaluation of patients participating in a novel online short-term therapy for IUD indicated that psychopathological symptoms and impairments of functioning have an impact on addictive Internet behaviors and consequently, need to be addressed in the treatment of IUD. Based on the results, further implications for clinical practice and research on addictive Internet behavior are derived.

1. Introduction

Addictive Internet behaviors have emerged as a serious mental health problem, considering the widespread individual impairments and negative societal consequences [1–3]. Research findings have demonstrated that addictive Internet behaviors are linked to a variety of psychological and social strains, behavioral concerns, decreased mental well-being [4] and reduced quality of life [5].

In addition, studies have revealed that comorbidity of mental disorders appear to be prevalent among addicted Internet users, contributing to increased symptom severity and diminished treatment outcomes [6–8]. Psychopathologies, increased levels of stress and negative emotions can, among others, promote the development of addictive behavior, if those affected try to reduce or compensate corresponding conflicts or aversive conditions through Internet usage [9]. Consequently, it can be assumed that patients with addictive Internet

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behavior exhibit further psychopathological impairments in clinical settings, that may be crucial for addiction symptomatology and treatment outcomes [6; 8]. Considering this, an investigation of the impact of psychopathological impairments on addictive Internet behaviors remains crucial in order to promote the establishment of treatment interventions [3].

Further, standardized criteria for the classification of addictive Internet behaviors are required to achieve nosological consensus for research and clinical practice [10,11]. The *American Psychiatric Association (APA)* has provided a preliminary diagnostic framework with the inclusion of *Internet Gaming Disorder (IGD)* in the appendix of DSM-5, as condition requiring further investigation [12]. The proposed definition of diagnostic criteria for IGD in DSM-5 has been emphasized as a substantial achievement regarding standardized classification and the development of effective treatment approaches [13–15]. Based on accumulated evidence as well as clinical and public health needs [16], the *World Health Organization (WHO)* has also included *(Internet) Gaming Disorder* as a disorder due to addictive behavior in the 11th revision of the ICD, distinguishing between exclusively or predominantly online and offline behaviors [17]. Besides IGD, there is increasing evidence that other Internet behaviors related to social networks, pornography, information or shopping platforms are of comparable clinical relevance in terms of addiction potential and impairments of psychosocial functioning [2,18,19]. According to ICD-11, these types of addictive Internet behaviors can be categorized as other (unspecified) disorders due to behavioral addictions [17]. To summarize addictive behaviors manifesting in the context of Internet applications and services, such as online gaming, online pornography, shopping and information platforms, along with social networks and generalized addictive Internet behaviors [20,21] the umbrella term *Internet Use Disorders (IUD)* will subsequently be used [11].

Since definition of a diagnostic framework, research on IUD has debated the appropriateness of diagnostic criteria in capturing clinical reality [13,15,22]. Reaching consensus on clinical features and characteristics of IUD seems essential to reliably identify IUD and to ensure appropriate treatment for affected individuals [11,22]. In order to obtain empirical evidence on factors influencing symptom severity of IUD an analysis of psychopathological conditions appears encouraging, particularly as they can interfere substantially with addiction symptomatology and treatment outcome [8]. Similarly, in a manifesto based upon research from COST Action CA16207 *European Network for Problematic Usage of the Internet*, describing key research priorities in the area of addictive behaviors investigations regarding the impact of psychosocial factors on clinical outcomes in treatment-seeking populations, were highlighted as relevant, among other objectives [1,23].

To further contribute to our knowledge on clinical features of addictive Internet behaviors, this study aimed to analyze effects of psychopathological symptoms and psychosocial impairments of functioning on symptom severity of IUD. Additionally, a comparative analysis of moderate and severe addictive Internet behaviors in a clinical context was conducted to provide insights regarding distinguishing features. For this purpose, a sample of patients participating in a novel online short-term therapy for IUD was examined. The clinical evaluation of this sample provides important insight into the field of behavioral addiction research and the clinical practice. Central research hypotheses are outlined in the following.

(1): Do psychopathological conditions have an impact on symptom severity of IUD, and temporal duration of addicted Internet behavior?

(2): Do impairments of functioning have an impact on symptom severity of IUD, and temporal duration of addicted Internet behavior?

(3): What differences in terms of psychopathological conditions and impairments of functioning emerge in moderate compared to severe addictive Internet behaviors?

2. Materials and methods

2.1. Participants

Participants were recruited as part of the randomized, two-arm, parallel-group, observer-blind trial *Stepped Care Approach for Problematic Internet use Treatment* (SCAPIT; German: SCAVIS) with >6000 screenings and 973 individuals assigned to an intervention or control group. The SCAPIT study was designed to empirically evaluate online-based interventions intended to encourage functional use of Internet applications and services (ID: DRKS00025994). The online stepped care approach was delivered via the smart@net app [24].

The sub-sample of this analysis is limited to the most affected participants ($N = 57$) receiving an online therapy within the stepped care approach (Fig. 1). Acquisition of participants of the sub-sample stretched from October 2021 to May 2023, and was largely conducted in an online setting. Additionally, individuals exhibiting symptoms of IUD and requesting psychotherapeutic support at one of the participating clinical consortium centers were included (Table 1). To participate in the SCAPIT study, interested study participants between 16 and 67 years of age were required to digitally sign a consent form via the smart@net app. Based on a sensitive cut-off defined as ≥21 points on the *Compulsive Internet Use Scale (CIUS)* [25] in the initial screening, study participants were randomly assigned to the intervention or control condition. Participants in the intervention condition were included in the online short-term therapy if one of the following conditions were fulfilled: Clinically relevant symptomatology in terms of a lack of success in previous intervention module 2 of the stepped care approach (CIUS score ≥ 21 and presence of 3 adapted criteria for IUD according to DSM-5 or one criterion sensu ICD-11) and presence of at least 6 adapted criteria for IUD sensu DSM-5 [24]. To assess the symptom severity of addictive Internet behaviors, the DSM-5 and ICD-11 criteria for disorders due to behavioral addictions were applied to the broader definition of IUD. Furthermore, an admission of participants to the online therapy required statutory health insurance and written consent to a therapy and treatment contract.

The following criteria conditioned exclusion from online short-term therapy: Language barriers potentially affecting comprehension of intervention content, receiving (psycho)therapeutic help within the last four weeks, unstable psychopharmacotherapy or dosage in a period of 17 weeks, severe impairments of psychosocial functioning, defined by a score of <40 in the *Global Assessment of Function (GAF)*,presence of severe comorbid disorders, as well as indications of suicidality or acute crisis situations indicating a face-to-face treatment modality, along with organically caused mental disorders. The GAF score was used as a measure of symptom severity and psychosocial functioning at the time of admission to the online therapy. A value of <40 in the expert assessment indicated that an online therapy does not appear to be appropriate due to pronounced symptom burden and dysfunction.

Access pathways to the online short-term therapy embedded in the stepped care approach of the SCAVIS study are illustrated in Fig. 1. More detailed information can be found in the published study protocol [24].

2.2. Online short-term therapy

The third intervention module of the SCAPIT study provided an online short-term therapy for IUD based on a cognitive behavior therapy (CBT) manual for Computer game and Internet addiction [26]. Efficacy of the underlying treatment approach was empirically evaluated in the multicenter randomized-controlled trial *Short-Term Treatment of Internet and Computer Game Addiction (STICA),* published in 2019. Results of an intent-to-treat analyses ($N = 143$ subjects) demonstrated significant improvement in addictive Internet behaviors in terms of symptomatic remission in 69.4% of participants in the intervention condition compared with 23.9% of participants in the waiting control condition in an outpatient setting (odds ratio = 10.10; 95% confidence interval =

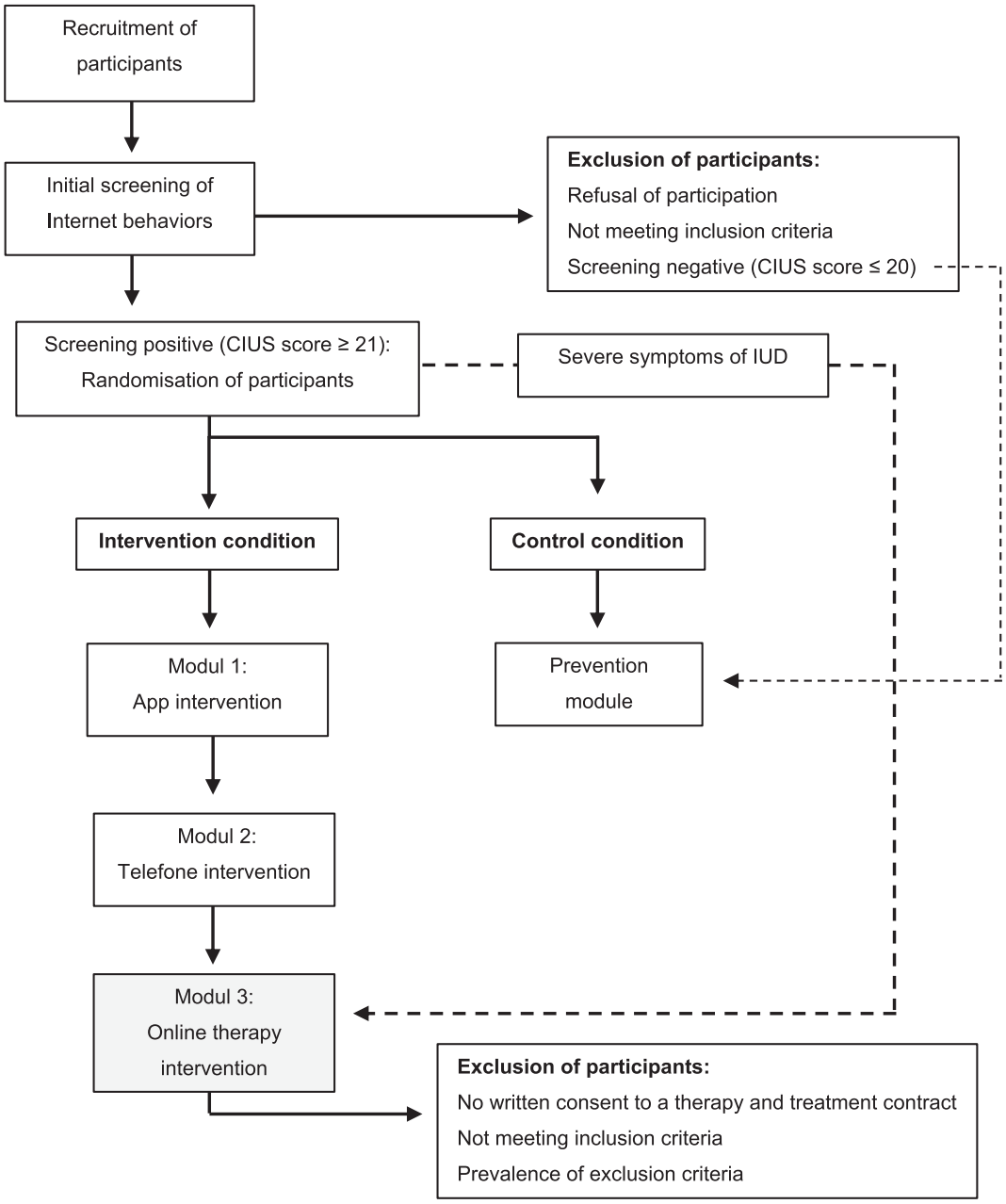

Fig. 1. Flow chart of access pathways to the online short-term therapy (in accordance with Bischof et al., 2022).

Table 1
Access pathways of participants to the short-term online therapy.

Pathways	n (%)
Advertisement on social media	27 (47.4)
Advertisement on streaming platform	14 (24.6)
Advertisement on information platform	5 (8.8)
On recommendation of a related person	4 (7.0)
Outpatient addiction services	3 (5.3)
Pro active search	3 (5.3)
Employer information	1 (1.8)

Note. $N = 57$

3.69 to 27.65). Compared to the waiting control condition, moderate to high effect sizes were found for symptom severity, operationalized with the *Assessment of Internet and Computer game Addiction (AICA-S)* sum score ($d = 1.19$), temporal duration of weekly Internet use ($d = 0.88$), and psychosocial impairments of functioning ($d = 0.64$) when STICA treatment was completed [27]. In consideration of the encouraging evidence of efficacy, the manualized, short-term CBT was transferred to an online setting as part of the SCAPIT study.

During the 17-week intervention, study participants received 15 group and 8 individual therapy sessions, plus two optional booster sessions to accompany transfer of therapeutic success. Video-based therapy was carried out via a data protection-compliant platform of Facharzt Sofort GmbH (Viomedi), which is certified according to internet privacy standards (ips). The online short-term therapy included abstinence-focused interventions regarding the addictive Internet behaviors such as definition of therapeutic aims, psychoeducation on the development and maintenance of behavioral addictions, implementation of behavioral analyses, and establishment of an individual online time management. Additionally, comorbid psychopathologies and psychosocial strains were addressed in order to enhance a balanced lifestyle and to achieve improvements in problem areas associated with addictive Internet behaviors [24].

2.3. Assessment

Data collection focused on the first measurement point at the beginning of the online short-term therapy for IUD. An electronic diagnostic assessment was applied in form of a standardized case report file (eCRF), comprising German versions of self-report survey instruments. An overview of data collection points and assessment measurements is presented in the study protocol [24]. The online-based survey was encrypted and pseudonymized on the basis of an Identification Number (ID) to ensure unambiguous assignment of the data. The encrypted eCRF was divided in the context of the first individual session via the video-based therapy platform viomedi.de for transmission in compliance with data protection regulations. In addition to the application of the assessments outlined subsequently, a clinical evaluation regarding manifestations of IUD was documented at the first survey time point.

2.3.1. Internet use disorders

The self-report instrument AICA-S was applied in order to assess symptom severity of IUD and online behavioral data. Based on the items, the following core characteristics of addictive Internet behaviors are depicted: Loss of control and interest in other activities, tolerance, withdrawal, continuation of consumption notwithstanding adverse consequences, emotion regulation, threatening perspectives. Additionally, the self-report procedure captures craving for the preferred online activity [28]. Recorded online activities contained: Gaming, shopping, chatting, writing e-mails, pornography, gambling, communities, information, (video) streaming. Activities in online communities and chatting were categorized as social networking, while composing emails was classified as information research. The measurement contains 13 items ranging from 0 points (= not at all/never) to 4 points (= very often/very strongly) and additional six items with a dichotomous response format [28]. The AICA-S sum score and mean duration of Internet use were calculated for further analyses. To generate the sum score, item values were recoded into criterion scores, which were summed up (maximum count = 27 points). Additionally, a dichotomous categorization of participants was performed based on the AICA-S sum value according to the following cut-off values: 7.0–13.0 points = moderate addictive Internet behavior; 13.5–27.0 points = severe addictive Internet behavior. Cronbach's alpha in the sample was 0.76 representing an acceptable internal consistency. Based on self-report data collected using the AICA-S and a clinical assessment of addictive Internet behaviors, IUD was diagnosed at the beginning of the online therapy. In accordance with the proposal to standardize the terminology for addictive Internet behaviors by Rumpf et al. (2021) the following disorders were distinguished: Gaming Disorder predominantly online, Social Networks Use Disorder, Pornography Use Disorder (online), Shopping Disorder (online), addictive use of video- and streaming or information and generalized addictive Internet behavior [10].

2.3.2. Depression

The revised version of the *Becks Depression Inventory (BDII-II)* was applied for the assessment of depressive symptoms and the classification of symptomatic severity. The questionnaire contains 21 items with 4 statements (response range = 0–3 points). For the evaluation, the values of the individual statements are summed (maximum value = 63 points) and compared with cut-off values [29]. According to the German S3 guideline for unipolar depression, the following values apply to the BDI-II: 0–12 points = clinically unremarkable or remitted symptomatology; 13–19 points = mild symptoms of depression; 20–28 points = moderate symptoms of depression; 29–63 points = severe symptoms of depression [30]. Cronbach's alpha calculated for the BDI-II was 0.93 in the sample demonstrating an excellent internal consistency.

2.3.3. Social phobia

The *Liebowitz Social Anxiety Scale (LSAS)* was applied for the assessment of symptom severity of social phobia. The level of anxiety and avoidance in the past week is recorded on the basis of 24 items, addressing performance and interaction scenarios. The assessment is made on a scale from 0 to 3 points. A total scale value can be calculated by summing the item ratings (maximum value = 144). Classification of the sum score is performed according to the cut-off values: 55–65 points = moderate symptoms of social phobia; 65–80 points = moderate symptoms social phobia; 80–95 points = severe symptoms of social phobia; above 95 points = extremely severe symptomatology [31]. Cronbach's alpha of the LSAS was 0.95 in the sample demonstrating an excellent internal consistency.

2.3.4. Somatic symptoms

The PHQ-15 is a module of the *Patients Health Questionnaire (PHQ—D)* providing a survey of the severity of somatic symptoms. On the basis of 13 items, impairments in the last 4 weeks due to multiple physical complaints are mapped with a dichotomous response format. In addition, two items from the depression module of the PHQ-D are included to map the somatic symptoms of sleep disturbance and fatigue. Participants of the online short-term therapy measured severity of somatic symptoms on a scale from 0 (= does not bother me at all) to 2 (= bothers me a lot). A score of zero represented the absence of a symptom. For the additional items of the PHQ-9 depression module, the response options were coded as 0 (= not at all), 1 (= some days) or 2 (= almost every day) [32; 48]. Based on the items, a sum score (maximum score = 30) can be calculated as a measure of symptom severity. Interpretation of the total score was done according to the following classification: 0–4 points = minimal somatic symptomatology, 5–9 points = mild somatic symptomatology, 10–14 points = moderate somatic symptomatology, above 15 points = severe symptom severity [32]. Cronbach's alpha of the PHQ-15 was 0.76, indicating acceptable internal consistency.

2.3.5. Impairments of functioning

Besides self-report measurements, the *Global Assessment of Functioning (GAF)* was applied as a clinician rating instrument to evaluate the level of psychological, social, and professional impairments of functioning on a continuum ranging from mental illness (= 0) to health (= 100). The selection of a particular range of levels depends on the assessment of the severity of symptoms or the degree of functioning based on standardized criteria. The GAF scale explicitly excludes impairments of functioning due to physical or environmental limitations [33]. To determine construct and criterion validity of the clinical assessment of impairments of functioning, operationalized with the GAF score, Pearson product-moment correlations with external criteria were performed. Statistically significant correlations were found for GAF scores regarding depressive symptoms (BDI-II: $r = -0.32$; $p = .01$), somatic symptoms (PHQ-15: $r = -0.28$; $p = .03$), symptom severity of IUD (AICA-S sum score: $r = -0.33$; $p < .01$), and time spent online (Mean duration: $r = -0.28$; $p = .03$). Consequently, increasing psychopathological strains and symptoms of IUD were associated with severer impairments in psychosocial functioning. For social phobic symptoms (LSAS: $r = -0.09$; $p = .46$) no statistically significant associations were found.

2.4. Data analysis

Statistical data analysis was performed with SPSS version 29 (IBM Corp., Armonk, NY, USA) for Mac. Significance level for conducted analyses was $p < .05$ (two-tailed). For descriptive data analysis, percent frequencies as well as mean (*M*) and standard deviations (*SD*) at metric scale level were presented. Chi-square test (χ^2 tests) respectively exact Fisher-Freeman-Halton tests for >20% cell frequencies with values <5 were calculated for nominally scaled variables. Cramer's V (V) was determined as measure of effect size with values of 0.1 indicating small, 0.3 medium and 0.5 large effects respectively. At the metric scale level, bivariate Pearson product-moment correlation analyses were

performed. The correlation coefficient (r) served as a quantitative measure for a description of the relative strength of the correlations as well as for a test of significance [34].

Requirements for parametric testing procedures were examined a priori. Linear Regression analyses were calculated with psychopathological symptoms and impairments in psychosocial functioning levels as separate predictors. Symptom severity of IUD operationalized by AICA-S sum score and mean duration of Internet use were dependent variables. The corrected coefficient of determination (R^2) was applied as a measure of the variance explained by the model. In accordance with Cohen [34], R^2 of 0.02 indicated a small effect, while R^2 of 0.13 represented a medium and R^2 of 0.26 a large effect. An unifactorial multivariate analysis of variance (MANOVA) was calculated for testing differences in psychopathological characteristics and impairments of psychosocial functioning of participants exhibiting moderate compared to severe addictive Internet behaviors. Post-hoc factorial analyses of variance (ANOVA) were performed for each dependent variable. The F-test statistic and Wilks Lambda (Λ) were consulted as indicators for the analysis of group differences. The partial Eta-squared (η^2) was a measure of effect size and variance explanations, with higher values indicating that potential group differences were due to our independent variable. The interpretation of effect size was based on cut-offs of 0.01 indicating a small effect, 0.06 indicating a medium, and 0.14 for a large effect [34].

3. Results

3.1. Sociodemographic and clinical characteristics of participants

The sub-sample of this analysis consisted of $N = 57$ participants, predominantly men ($n = 33$; 57.9%) with an average age of 29.12 years ($SD = 9.05$). Further sociodemographic characteristics of the sample are presented in Table 2. Cross tabulations were created to test an association of gender and dichotomous classification of the IUD symptom severity ($X^2(2) = 3.98$; $p = .14$; V = 0.26). Further, no statistically significant results were observed with respect to sociodemographic variables similarly.

The average time spent online was 5.81 h (SD = 1.96). The average onset of Internet use was 15.86 years (SD = 5.91). Majority of participants reported a pathological use of Video and Streaming platforms ($n = 33$; 57.9%) as a condition for accessing the online intervention. Other manifestations of IUD reported in the study sample were Social Network Use Disorder ($n = 11$; 19.3%), Internet Gaming Disorder ($n = 5$; 8.8%), and online Pornography Use Disorder (n = 3; 5.3%), while a generalized online behavior was assessed in 5.3% ($n = 3$) of the individuals, meaning that there was no clear preference for a specific Internet activity (e.g., streaming portals and social networks were used excessively). Two participants (3.5%) stated a pathological use of information platforms. Based on AICA-S sum score ($M = 11.60$; $SD = 3.30$), participants of the online short-term therapy presented moderate ($n = 44$; 77.2%) to severe ($n = 13$; 22.8%) symptoms of addictive Internet use. No statistically significant results were found for associations of sociodemographic characteristics and manifestation of IUD. Regarding symptom severity (dichotomous coded in moderate or severe) and certain manifestations of IUD, a statistically significant relationship was found ($X^2(5) = 9.81$; $p = .04$; V = 0.45) with a large effect size in two-tailed exact Fisher-Freeman-Halton test calculated based on an expected cell frequency of <5 in 75.0% of the cells.

Preferred Internet applications and contents for both subgroups differentiated according to dichotomous coding of symptomatology are visualized in Fig. 2.

Participants of the online intervention exhibited mild symptom severity regarding depressiveness (BDI-II: $M = 17.54$; $SD = 11.62$) and somatic symptomatology (PHQ-15: $M = 8.23$; $SD = 4.73$), while mean sum scores for social phobia (LSAS: $M = 45.63$; $SD = 25.82$) were below clinical cut-off value indicating an absence of symptomatology. In terms of impairments of functioning (GAF: $M = 65.68$; $SD = 10.27$), participants showed some mild symptoms or difficulties regarding social, occupational, or educational performance, with overall relatively good functioning and existing interpersonal relationships.

Table 2
Sociodemographic characteristics of the study sample.

Variables	Total sample	Moderate IUD[a]	Severe IUD[a]
	n (%)	n (%)	n (%)
Gender			
Male	33 (57.9)	28 (63.6)	5 (38.5)
Female	22 (38.6)	14 (31.8)	8 (61.5)
Diverse	2 (3.5)	2 (4.5)	
Migration background			
No	51 (89.5)	33 (75.0)	11 (84.6)
Yes	4 (7.0)	40 (90.9)	42 (15.4)
Missing	2 (3.5)	4 (9.1)	
Family status			
Married or registered partnership	8 (14.1)	5 (11.4)	3 (23.1)
Single	45 (78.9)	36 (81.8)	9 (69.2)
Divorced	2 (3.5)	1 (2.3)	1 (7.7)
Missing	2 (3.5)	2 (4.5)	
Children			
No	42 (73.7)	33 (75.0)	9 (69.2)
Yes	11 (19.3)	7 (15.9)	4 (30.8)
Missing	4 (7.0)	4 (9.1)	
Highest Occupational qualification			
No high school diploma	3 (5.3)	3 (6.8)	2 (15.4)
High school diploma	19 (33.3)	17 (38.6)	3 (23.1)
Professional qualification	11 (19.3)	8 (18.2)	4 (30.8)
Graduated Bachelor study	15 (26.3)	11 (25.0)	4 (30.8)
Graduated Master study	9 (15.8)	5 (11.4)	

Note. Total sample $N = 57$ (moderate IUD n = 44; severe IUD n = 13).
[a] Dichotomous coding based on sum value of the Assessment for Computer game and Internet Addiction.

3.2. Results of hypothesis testing

In order to investigate contribution of psychopathological strains and impairments of psychosocial functioning in predicting symptom severity and time duration of Internet use, linear regression analyses were conducted. Results of research hypotheses (1) and (2) are presented in Table 3.

Coefficients of linear regression analyses investigating effects of psychopathological strains (BDI-II; LSAS; PHQ-15) and impairments of psychosocial functioning (GAF) on the symptoms of IUD.

An observation of the corrected coefficient of determination R^2 showed small to medium effects. In terms of symptom severity of IUD, the percentage of variance explained by individual predictor models ranged from 5.0% for social phobia symptomatology, 9.4% for impairments of functioning, to 12.2% for somatic symptoms and 13.7% for depressive symptoms. The percentage of variance for the dependent variable Internet use time explained by individual predictor models ranged from 6.2% for impairment of functional level to 7.0% for depressive symptoms.

The unifactorial MANOVA analysis revealed overall a statistically significant difference between participants with moderate and severe addictive Internet behaviors for the combined dependent variables psychopathological strains and impairments of psychosocial functioning ($F(5,51) = 2.44$; $p = .04$; partial $\eta^2 = 0.19$; Wilk's $\Lambda = 0.80$). Post-hoc univariate ANOVAs were conducted for every dependent variable (Table 4). The results indicated pronounced symptom burdens in terms

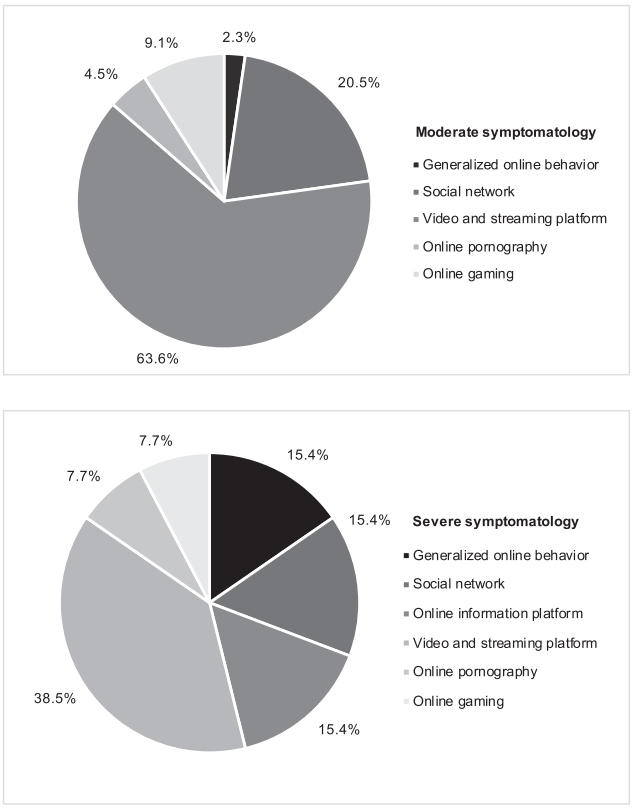

Fig. 2. Percentages of pathological used internet applications or -contents for participants exhibiting moderate or severe addictive Internet behaviors.

Table 3
Coefficients of linear regression analyses investigating effects of psychopathological strains (BDI-II, LSAS, PHQ-15) and impairments of functioning (GAF) on symptoms of IUD.

	Coefficients						
						95% CI	
Model	B	SE (B)	β [a]	t	p	CI -	CI +
DV = AICA-S sum							
BDI-II	0.11	0.03	0.39	3.12	0.00**	0.04	0.18
LSAS	0.03	0.02	0.26	1.99	0.05*	0.00	0.07
PHQ-15	0.26	0.08	0.37	2.96	0.00**	0.08	0.43
GAF	−0.11	0.04	−0.33	−2.61	0.01**	−0.19	−0.02
DV = Duration							
BDI-II	0.05	0.02	0.29	2.28	0.03*	0.01	0.09
LSAS	0.00	0.01	0.05	0.38	0.70	−0.02	0.02
PHQ-15	0.06	0.05	0.14	1.03	0.30	−0.05	.17
GAF	−0.05	0.02	−0.28	−2.17	0.03*	−0.10	−0.01

Note. $N = 57$.
[a] Standardized β coefficient, CI - = Lower limit; CI + = Upper limit; DV = Dependent variable; AICA-S sum = Sum value of the Assessment for Computer game and Internet Addiction; Duration = Mean time spent online; BDI-II = Becks Depression Inventory II; LSAS = Liebowitz Social Anxiety Scale; PHQ-15 = Subscale Somatic Symptoms of the Patient Health Questionnaire; GAF = Global Assessment Scale of Functioning. *p < .05. **p < .01.

of depressiveness and somatic symptomatology along with impairments of functioning in participants presenting more severe symptomatology of IUD. Effect sizes ranged from medium to large.

Table 4
Post-hoc analyses to explore differences between moderate and severe levels of IUD.

Measure	Moderate IUD [a]		Severe IUD [a]		F (1, 55)	p	η^2 [b]
	M	*SD*	*M*	*SD*			
BDI-II	15.73	11.78	23.69	8.93	5.06	0.03*	0.08
LSAS	42.32	25.21	56.85	25.68	3.31	0.07	0.06
PHQ-15	7.52	4.22	10.62	5.72	4.56	0.04*	0.08
GAF	67.25	9.06	60.38	12.59	4.78	0.03*	0.08

Note. Total sample $N = 57$ (moderate IUD $n = 44$; severe IUD $n = 13$).
M = *Mean; SD = Standard Deviations.* BDI-II = Becks Depression Inventory II; LSAS = Liebowitz Social Anxiety Scale; PHQ-15 = Subscale Somatic Symptoms of the Patient Health Questionnaire; GAF = Global Assessment Scale of Functioning.
*$p < .05$. **$p < .01$.
[a] Dichotomous coding based on sum value of the Assessment for Computer game and Internet Addiction.
[b] Effect sizes were assessed by partial eta squared.

4. Discussion

Objective of this study was to analyze effects of psychopathological symptoms and psychosocial impairments of functioning on symptomatology of IUD in a clinical setting. Further, a comparative analysis of moderate and severe addictive Internet behaviors was conducted. For this purpose, a sample of patients participating in an online short-term therapy for IUD was examined. The majority of participants reported a pathological use of video and streaming platforms ($n = 33$; 57.9%) as reason for attending the online intervention. Other forms of IUD identified in the study sample were Social Network Use Disorder, Internet Gaming Disorder, online Pornography Use Disorder along with an addictive use of information platforms and generalized addictive Internet behavior.

The high prevalence of addictive Internet behaviors related to video and streaming platforms in the present sample might be caused by the primary online recruitment of participants. In fact, 14 participants reported that they were recruited to participate in online therapy via advertisements on video and streaming platforms. Another explanation might be that video streaming platforms are increasingly overused due to rapid developments in recent years and the combination of user-friendliness, broad accessibility and extensive content, leading to aversive consequences such as a neglect of other activities [52,54]. Results of a systematic review on excessive video and streaming behavior [38] further demonstrated, in terms of usage motivation and engagement, that this behavior seemed to be primarily driven by reward-based and eudaemonic factors, such as an experience of entertainment or personal enrichment, outcome expectations and attempts to avoid negative emotions such as loneliness or stress [39,51,53–55]. These findings illustrate similarities to the development and maintenance of other addictive Internet behaviors and indicate that excessive consumption of video and streaming platforms might have addictive character and can be classified as IUD [38,50]. An unexpectedly high usage preference of video and streaming platforms was analogously noted in previous studies [9,35,39]. The widespread availability of web-based video and streaming services is a relatively recent development, and behavioral addiction in the context of this digital medium has received less consideration in the research literature so far. Nevertheless, investigations examining altered online behavior, particularly during the COVID-19 pandemic [36–38], revealed a widespread increase for Internet activities, that also appear to be emerging among video and streaming portals. Considering this, research needs to clarify the clinical relevance of addictive behavior related to the use of video and streaming platforms. Further research regarding specific psychological mechanisms involved in the development and maintenance of this type of addictive Internet behavior is required to establish a framework for understanding [40].

Majority of participants presented moderate (n = 44; 77.2%) symptoms of IUD operationalized via the AICA-S sum score. For dichotomous coding of symptomatology and certain manifestations of IUD, a statistically significant association was found indicating that distinct online activities appear to be related to severe symptom levels. This emphasizes the importance of further studies addressing differences in the psychopathology of certain types of behavioral addictions. Consistent with previous findings [35,41,42], results of the analyses indicate that psychopathological strains in terms of depressiveness, social phobic and somatic symptoms as well as impairments of functioning have an impact on symptom severity of IUD with small to medium effect sizes. Regarding duration of Internet use, impairments of functioning and depressive symptoms were found to have significant effects on IUD symptoms with small effect sizes. The comparative analysis supports these assumptions, as differences in depressive and somatic symptoms as well as impairments of functioning were highlighted among participants with moderate compared to severe addictive Internet behaviors. Given the medium to high effect sizes of group differences, affected individuals appear to exhibit higher levels of strains in terms of psychopathological symptoms and impairments with increasing severity of IUD symptomatology.

These results are relevant for clinical practice and the treatment of IUD, as they illustrate that therapeutic interventions need to be tailored to the symptom complexes of those affected [43,44]. Consequently, psychopathological distress and impairment of psychosocial functioning must be addressed in the treatment of IUD [45]. It can be assumed that symptomatic reductions in psychopathological and functional impairments are associated with improvements in IUD symptoms. In addition, promoting awareness of the clinical characteristics of the IUD and its associated features in clinical practice appears to be important [35,36] to ensure that patients receive appropriate treatment [18].

4.1. Limitations

Several limitations constrain interpretation of results of the present study. First, manifestations of IUD were distinguished in descriptive analyses, although diagnostic criteria are currently available only for IGD [16,17]. Certain forms of IUD were classified based on self-report measures in the AICA-S and a clinical assessment of addictive Internet behaviors [28]. The use of self-report measurement instruments entails shortcomings, such as social desirability bias. Although, validity of the classification of IUD made in this analysis is supported by previous studies that have demonstrated psychometric properties, criterion and construct validity, and clinical validity of the assessment [46,47]. Additionally, an acceptable Internet consistency was demonstrated in the present sample. The PHQ-15, which includes an item on menstrual cramps and problems with the period, was used to assess somatic symptomatology. The inclusion of an item measuring menstrual symptoms in an overall score can lead to a gender bias in the assessment. Previous studies have, however, demonstrated reliability and validity of the questionnaire in health care. Settings [48,49]. Consequently, no gender-specific adjustment of the questionnaire was made in this analysis. The stepped design of the SCAPIT study has the potential to facilitate access to interventions that are adapted to the symptom severity of addictive Internet behaviors. However, conducting repeated assessments of participants during the study might have an impact on the evaluation of symptoms and might lead to an increased sensitivity for addictive behaviors. Addictive Internet behaviors were considered as nosological entity, and no differentiation among distinct IUD was performed. Addictive Internet behaviors were not differentiated due to the small sample size, which was a methodological limitation of this analysis. Future research should examine differences and similarities among certain manifestations of IUD and investigate which types of addictive Internet behaviors are related to severe psychopathological strains and impairments of functioning. Due to a cross-sectional design of the analysis, no conclusions can be drawn regarding causality in any direction. The examination of causalities should be objective of future longitudinal studies. Despite this limitation, the investigation of the effects of psychopathological strains on addictive Internet behavior in a sample of participants of a novel short-term online therapy appears to be relevant for clinical practice and the treatment of IUD. Another limitation arises with respect to the inclusion of a specific selection of psychopathological condition, which limits findings on the association of predictive factors on IUD. Future research should incorporate additional forms of psychopathological conditions in order to analyze complex interactions, accounting for potential mediating and moderating effects. Continued studies with clinical populations in the context of online interventions for IUD are required to validate findings presented in this analysis.

4.2. Conclusion

Research on treatment interventions for IUD is still a relatively young field and further studies in clinical settings are required. In this study, participants of a novel online short-term therapy for IUD were included to provide insights into clinical features of addictive Internet behaviors. The clinical evaluation of patients indicated that psychopathological symptoms and impairments of psychosocial functioning have an impact on addictive Internet behaviors. In terms of clinical implications for intervention measures, these findings emphasize that considering psychopathological strains and impairments appears to be of crucial importance in the treatment of IUD.

Statement of ethics

The SCAPIT study was positively reviewed by ethics committees of the University of Lübeck (reference: 21–068), Freie Univesität Berlin (reference: 015.2021) and the ethical camber in Mainz (reference: 2021–15,907). Subsequent modifications were submitted in the form of amendments. Written consent to the processing of the data collected was obtained.

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Credit authorship contribution statement

LB: Conceptualization, Methodology, Investigation, Formal analysis, Software, Validation, Visualization, Writing – Original draft, Writing – Review & Editing.

HJR: Project administration, Funding acquisition, Conceptualization, Methodology, Investigation, Validation, Supervision, Writing – Review & Editing.

MD: Conceptualization, Methodology, Investigation, Validation, Supervision, Writing – Review & Editing.

HS: Conceptualization, Methodology, Investigation, Validation, Supervision, Writing – Review & Editing.

BR: Writing – Review & Editing.

OG: Writing – Review & Editing.

KW: Conceptualization, Methodology, Investigation, Validation, Supervision, Writing – Review & Editing.

The corresponding author drafted the manuscript with input from co-authors. The authors take responsibility for the integrity of the data as well as the accuracy of the data analysis and have approved the final

manuscript.

Declaration of Competing Interest

The authors declare no conflict of interest.

Data availability

Data can be provided on request. Data analysis of the SCAPIT project has not yet been completed.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.comppsych.2024.152471.

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