

Association Between Internet Gambling and Problematic Internet Use Among Adolescents

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Abstract The study objectives were to evaluate the correlates and psychosocial implications of internet gambling among adolescents, as well as the association between internet gambling and problematic internet use. A cross-sectional study design was applied among a random sample ($N = 484$) of adolescents (71.2% boys; 28.8% girls; mean age \pm standard deviation, $SD = 14.88 \pm 0.55$ years). Self-completed questionnaires, including internet gambling practices, internet use characteristics, Young Internet Addiction Test, and Strengths and Difficulties Questionnaire were utilized. The prevalence of internet gambling was 15.1%. Internet gambling was associated with psychosocial maladjustment, including Abnormal Conduct Problems (gender adjusted odds ratio, $AOR = 3.83$; 95% confidence interval, 95% CI: 1.86–7.92) and Borderline Peer Problems ($AOR = 2.04$; 95% CI: 1.09–3.85). The likelihood of concomitant problematic internet use was significantly higher among internet gamblers ($AOR = 1.81$; 95% CI: 1.03–3.19). Multivariate regression analyses indicated that among all characteristics of internet use assessed, utilizing the internet for the purposes of gambling practices was independently associated with problematic internet use among adolescents ($AOR = 3.43$; 95% CI: 1.40–8.39). Thus, the study findings suggest that adolescents who participate in internet gambling practices are more likely to concomitantly present with problematic internet use.

Keywords Adolescence · Internet gambling · Addictive behavior · Psychosocial aspects · Psychological adjustment

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Introduction

Due to the enhanced accessibility, availability, anonymity, and promotion of gambling practices through the internet, ever increasing proportions of youth populations have adopted internet gambling behaviors (Messerlian et al. 2004). During the past decade the adoption of such remote forms of gambling has contributed to marked demographic and cultural changes regarding gambling behaviors (Griffiths et al. 2006). Moreover, the continuously increasing frequency of internet gambling among adolescents may lead to the escalation of problematic gambling behaviors among this population group (Griffiths 2003; Griffiths and Barnes 2008; Griffiths et al. 2009; Ladd and Petry 2002).

The continuum of gambling behavior may be optimally conceptualized as that ranging from non-gambling, to social and recreational gambling, to problematic gambling, and finally to pathological gambling (National Research Council 1999). As a uniform definition of adolescent pathological gambling does not exist, the respective DSM-IV criteria (American Psychiatric Association 1994), as developed for adult populations (Ladouceur et al. 2005), are applied. The prevalence rate of gambling practices among adolescents is observed to range between 1.9% (Molde et al. 2009) and 15.1% (Moodie and Finnigan 2006).

The availability of the internet as a medium for gambling practices among adolescents is of particular concern (Dickson et al. 2008). Adolescents are particularly vulnerable to developing addictive behavioral patterns (Griffiths and Wood 2000; Pallanti et al. 2006). Specifically, adolescents are particularly prone to elevated rates of risk-taking behaviors since they both perceive themselves as invulnerable and do not readily acknowledge the potential adverse consequences of gambling (Derevensky et al. 2003). As a result, adolescents constitute a particularly high risk population group for developing problematic gambling behaviors.

The internet also provides a medium for unlimited opportunities to participate in gambling practices. Moreover, the internet per se may provide a less protective environment for vulnerable, and consequently potentially problematic, gamblers (Griffiths et al. 2006; Griffiths 2003). In particular, both the anonymity and accessibility secured by the internet medium allows for adolescents to readily participate in internet gambling at any time, regardless of the legal prohibitions and/or limitations imposed by governments regarding adolescent gambling in real-world gambling venues. Hence, the limitations imposed upon adolescent gambling practices are circumvented through the adoption of internet gambling. Furthermore, as opposed to the role of financial sums allotted to gambling, the frequency of gambling practices has been shown to be an essential indicator of potential gambling problems (Labrie et al. 2008; Nelson et al. 2008). Hence, the enhanced availability of gambling opportunities, and consequent potential increased frequency of gambling practices, has been associated with an enhanced risk for developing problematic gambling behaviors among adolescents (Griffiths 1999; Holtgraves 2009; Nelson et al. 2008; Welte et al. 2009).

The internet also allows for younger populations to participate in gambling. As the early onset of gambling behavior constitutes a risk factor for both the development and severity of problem gambling among youth (Dickson et al. 2002; Pallanti et al. 2006), the likelihood for developing consequent pathological gambling during adulthood may be augmented (Johansson and Götestam 2003). In addition, it has been posited that the early onset of gambling behaviors may enhance adolescents' risk of developing multiple addictive disorders, including that of internet addiction (Pallanti et al. 2006).

Adolescent gamblers experience gambling-related problems that often negatively impact their lives (Hardoon and Derevensky 2002; Wickwire et al. 2007), including deterred social relations (Gerdner and Svensson 2003), psychological maladjustment (Delfabbro et al. 2006), and conduct problems (Barnes et al. 2005; Vitaro et al. 2001), particularly among boys (Martins et al. 2008).

Pathological internet use, also known as problematic internet use, was proposed to encompass the following characteristics: (1) an uncontrollable use of the internet, (2) internet use which is markedly distressing, time-consuming or resulting in social, occupational or financial difficulties; and (3) internet use not solely present during hypomanic or manic clinical episodes (Shapira et al. 2000). Hence, the proposed criteria for problematic internet use are founded upon the nature and frequency of internet use, as well as its consequent detrimental effects upon individual functionality.

To date, the potential etiologic or possible confounding association between the scope of internet sites utilized and manifestation of problematic internet use has not been elucidated (Mitchell and Wells 2007). Furthermore, the association between the adoption of the internet as a means for the satiation of pathological behavioral patterns (Recupero 2008), such as that of gambling (Sun et al. 2009), and consequent development of problematic internet use has not been established (Griffiths 2003; Wöfling et al. 2009).

The first study objective was to evaluate the prevalence and characteristics of internet gambling among adolescents, as well as the associated effects upon adolescent emotional and behavioral characteristics. The second objective was to evaluate the association between internet gambling and problematic internet use among adolescents.

Method

Study Design and Study Population

A cross-sectional study design was used to evaluate the study objectives. Data collection was conducted during the period January 1st 2007–January 1st 2008. The study protocol was approved by the Ethical Committees of both the “P. & A. Kyriakou” Children’s Hospital in Athens, Greece, and the Hellenic Ministry of Education and Religious Affairs. Informed consent was requested from the legal guardians of eligible participants.

The study sample ($N = 529$) consisted of students attending Grades 9 and 10 at 20 randomly selected public junior high and high schools, stratified according to locality and population density, located within the urban district of Athens, Greece. No exclusion criteria for study participation, including demographic, socioeconomic or other factors were applied. The study sample consisted of 253 (47.8%) boys and 276 (52.2%) girls, with an overall mean age \pm standard deviation, SD, of 14.88 ± 0.55 years. Sixteen participants (3.0%) did not specify gender and were excluded from all further statistical analyses. Nine participants (1.7%) did not complete all components of the Young Internet Addiction Test (YIAT) and were consequently excluded from the analyses since problematic internet use could not be assessed. Among the remaining eligible sample ($n = 504$) the response rate for specifying internet gambling practices was 96.0% ($n = 484$).

Data Collection

Anonymous self-completed questionnaires were distributed to study participants on-site at their respective schools. Study participants were requested to complete the questionnaire

anonymously in order to minimize potential reporting bias. The questionnaire consisted of 5 components: (1) demographic information; (2) internet gambling practices; (3) history and frequency of internet use; (4) characteristics of internet use; (5) Young Internet Addiction Test (YIAT); and (6) the Strengths & Difficulties Questionnaire (SDQ).

Measurements

Internet gambling practices were based on self-reported frequency of internet gambling. Gambling in venues other than the internet was not assessed. The control group consisted of participants who reported either having never gambled over the internet and/or participation in internet gambling less than once per week. The case group included adolescents who participated in internet gambling at least once per week. Furthermore, infrequent internet gambling was defined as participation in internet gambling 1–4 times per week, while frequent internet gambling was defined as participation in such gambling practices at least 5 times per week.

The history of internet use was assessed by examining when study participants had first initiated internet use. Novel internet users were defined as those adolescents having initiated internet use during less than the past 6 months, recent internet users were those who had initiated internet use between the past 6–12 months, and experienced internet users were those adolescents who had initiated internet use for at least 1 year. The average quantity of hours per week that adolescents utilized the internet was assessed categorically according to the following predefined cutoff points: (1) non-users: 0–1 h/week; (2) low internet users: 1–3 h/week; (3) medium internet users: 4–10 h/week; (4) high internet users: 11–20 h/week; and, (5) excessive internet users: >20 h/week of internet use.

The characteristics of internet use assessed included both the locations (portals) of internet access and the scope of internet sites utilized. The locations of internet access included internet access via: (1) one's own home portal; (2) a friend's home portal; and (3) internet café portal. The purpose and scope of internet sites utilized included the following predefined categories: (1) e-mail correspondence; (2) retrieval of newspapers, journals, and periodicals (mass media); (3) chat room use; (4) internet role-playing games; (5) retrieval of information pertaining to services; (6) retrieval of information pertaining to work and education; (7) retrieval of information pertaining to sexual education; and (8) purchases of goods and services.

The YIAT was applied to assess the occurrence of problematic internet use (Young 1998). The YIAT consists of 20 items which provide calibrated scores ranging from 1 to 5, where a score of 1 is defined as ‘rarely’ and a score of 5 as ‘always’, respectively. The total YIAT score may range from 20 to 100, according to which higher scores (>40) reflect a greater tendency for problematic internet use. Specifically, the YIAT evaluates the degree of preoccupation (e.g., “How often do you feel preoccupied with the internet when off-line, or fantasize about being on-line?”), compulsive use (e.g., “How often do you try to cut down the amount of time you spend on-line and fail?”), behavioral problems (e.g., “How often you do you snap, yell, or act annoyed if someone bothers you while you are on-line?”), emotional changes (e.g., “How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?”), and impact upon functionality consequent to internet utilization (e.g., “How often do your grades or school work suffer because of the amount of time you spend on-line?”). The following cutoff points were applied to evaluate the occurrence of problematic internet use: (1) normal internet use: YIAT scores 0–39, and (2) problematic internet use: YIAT scores 40–100 (Young 1998).

The SDQ was utilized to assess participants' emotional and psychosocial adjustment consequent to internet use (Goodman 1999). The SDQ consists of 25 questions with calibrated response scores ranging from 0 to 2. The SDQ is comprised of five components (corresponding to 5 questions per component) that may each range between 0–10. The calibrated component scores are: (1) Emotional Symptoms Scale (e.g., "I am often unhappy, down-hearted or tearful.") (Normal: 0–5; Borderline: 6; Abnormal: 7–10); (2) Conduct Problems Scale (e.g., "I get very angry and often lose my temper.") (Normal: 0–3; Borderline: 4; Abnormal: 5–10); (3) Hyperactivity Scale (e.g., "I am easily distracted, I find it difficult to concentrate.") (Normal: 0–5; Borderline: 6; Abnormal: 7–10); (4) Peer Problems Scale (e.g., "I am usually on my own. I generally play alone or keep to myself.") (Normal: 0–3; Borderline: 4–5; Abnormal: 6–10); and (5) Prosocial Scale (e.g., "I usually share with others (food, games, pens, etc.) (Normal: 6–10; Borderline: 5; Abnormal: 0–4). With the exclusion of the Prosocial Scale, the sum (range 0–40) of the remaining SDQ component scores was derived in order to generate the Total Difficulties Score (Normal: 0–15; Borderline: 16–19; Abnormal: 20–40) of study participants. Scores ranging in the abnormal difficulties range are implicated with an increased likelihood for mental health disorders.

Statistical Analysis

Continuous variables were compared between groups with the student's *t*-test. Categorical variables were compared between groups with either the chi-square test or Fisher's exact test in cases where sample sizes did not exceed 5 participants. The Mantel–Haenszel method was used to calculate gender adjusted odds ratios (AOR) and respective 95% Confidence Intervals (95% CI) for the locations of internet access, scopes of internet sites visited, and SDQ component and total scores. Stepwise multivariate logistic regression was used to identify factors independently associated with the occurrence of problematic internet use. The factors evaluated included demographic variables (age and gender), characteristics of internet use variables (including history of internet use, weekly hours of internet use, location of internet access, and scope of internet sites visited), and internet gambling. The Hosmer and Lemeshow Goodness of Fit test was used to quantify the Wald chi-square value and final regression model. All analyses were conducted with SAS version 9.0 (SAS Institute Inc., USA).

Results

Internet Gambling Practices Among Adolescents

Among the study population ($n = 484$) the overall prevalence of internet gambling was 15.1% ($n = 73$). Among adolescent internet gamblers, 54.8% ($n = 40$) reported infrequent and 45.2% ($n = 33$) frequent internet gambling, respectively. Adolescent boys were more than 2.86 times (95% CI: 1.64–4.86) more likely to participate in internet gambling. No significant differences regarding either the history or weekly hours of internet use were observed according to internet gambling practices (see Table 1).

Adolescent internet gamblers utilized internet café portals more frequently and home portals less often than their non-gambling counterparts (see Table 2). However, a statistically significant difference regarding the locations of internet access according to internet gambling practices was not established (see Table 2).

Table 1 Characteristics of the study sample according to internet gambling practices

	Internet gambling group (<i>n</i> = 73)	Control group (<i>n</i> = 411)	<i>P</i>
Age (mean ± SD)	14.8 ± 0.54	14.9 ± 0.54	.262 [†]
Male gender	52 (71.2%)	192 (46.7%)	.0001 ^{‡**}
History of internet use			
Novel users (<6 months)	29 (39.7%)	145 (35.3%)	1.00
Recent users (6–12 months)	9 (12.3%)	57 (13.9%)	.603 [‡]
Experienced users (>12 months)	35 (47.9%)	209 (50.8%)	.570 [‡]
Average internet use			
0–1 h/week	41 (56.2%)	216 (52.6%)	1.00
1–3 h/week	16 (21.9%)	104 (25.3%)	.394 [‡]
4–10 h/week	5 (6.8%)	35 (8.5%)	.968 [‡]
11–20 h/week	4 (5.5%)	28 (6.8%)	.238 [§]
>20 h/week	7 (9.6%)	28 (6.8%)	.294 [‡]
Internet addiction test (mean ± SD)	35.94 ± 14.32	30.50 ± 11.86	.0006 ^{**}
Normal internet use	55 (75.3%)	353 (85.9%)	1.00
Problematic internet use	18 (24.6%)	58 (14.1%)	.039 [*]

[†] Student *t*-test *P*-value

[‡] Chi square test *P*-value

[§] Fisher's exact test *P*-value

** *P* < .01

Table 2 Locations of internet access, scope of internet sites used, and problematic internet use among adolescents according to internet gambling practices

	Internet gambling group (<i>n</i> = 73)	Control group (<i>n</i> = 411)	Adjusted Odds Ratio (95% CI) ^a
Locations of access			
Own home	48 (65.8%)	278 (67.6%)	0.88 (0.51–1.46)
Friend's home	30 (41.1%)	85 (20.7%)	1.40 (0.77–2.52)
Internet café	34 (46.6%)	175 (42.6%)	0.77 (0.45–1.32)
Sites accessed			
E-mail	24 (32.9%)	189 (46.0%)	0.51 (0.29–0.87)*
Mass media	10 (13.7%)	65 (15.8%)	0.97 (0.47–2.03)
Chat-rooms	34 (46.6%)	152 (37.0%)	1.53 (0.91–2.58)
Game-playing	55 (75.3%)	231 (56.2%)	1.81 (0.96–3.40)
Work/education	20 (27.4%)	108 (26.3%)	0.81 (0.43–1.50)
Services	16 (21.9%)	130 (31.6%)	0.95 (0.53–1.70)
Sexual information	6 (8.2%)	24 (5.8%)	1.26 (0.48–3.32)
Purchases of goods	7 (9.6%)	45 (10.9%)	0.77 (0.33–1.80)
Problematic internet use	18 (24.6%)	58 (14.1%)	1.81 (1.03–3.19)*

^a Gender adjusted odds ratio (AOR) and 95% confidence interval (95% CI)

* *P* < .05

In addition, adolescents who participated in internet gambling most frequently utilized the internet for the purposes of interactive games (see Table 2). In addition, while internet gamblers were observed to more frequently utilize the internet for the purposes of chat-rooms and retrieving information with sexual content, they did not significantly differ from their non-gambling counterparts. However, internet gamblers were approximately twice less likely to utilize the internet for the purposes of correspondence (see Table 2).

Emotional and Behavioral Problems Associated with Internet Gambling

With regard to the mean SDQ component scores, adolescents who participated in internet gambling had higher mean Conduct Problems and Peer Problems scores than the control group (see Table 3). Furthermore, following gender adjustment, adolescent internet gamblers were more than three times more likely to have an Abnormal Conduct Problems Score and twice as likely to have a Borderline Peer Problems Score. Therefore, adolescent internet gamblers had a greater likelihood of presenting with behavioral and social problems as compared to their non-internet gambling counterparts. However, it is noteworthy that the overall psychosocial adjustment (total SDQ score) of adolescents did not differ according to the adoption of internet gambling practices.

Table 3 Component and total strengths and difficulties (SDQ) scores among adolescents according to internet gambling practices

	Internet gambling group (<i>n</i> = 73)	Control group (<i>n</i> = 411)	Adjusted odds ratio (95% CI) [†]
Emotional symptoms score [‡]	2.94 ± 2.13	2.96 ± 2.32	0.956 [§]
Borderline	6 (8.2%)	28 (6.8%)	1.46 (0.57–3.79)
Abnormal	3 (4.1%)	36 (8.8%)	0.69 (0.20–2.40)
Conduct problems score [‡]	2.91 ± 1.78	2.27 ± 1.45	0.001 ^{§**}
Borderline	11 (15.1%)	55 (13.4%)	1.43 (0.68–2.98)
Abnormal	15 (20.5%)	27 (6.6%)	3.83 (1.86–7.92)*
Hyperactivity score [‡]	3.29 ± 1.81	3.12 ± 1.90	0.480 [§]
Borderline	6 (8.2%)	34 (8.3%)	1.21 (0.48–3.10)
Abnormal	1 (1.4%)	21 (5.1%)	0.27 (0.03–2.04)
Peer problems score [‡]	2.81 ± 1.43	2.41 ± 1.26	0.020 ^{§*}
Borderline	17 (23.3%)	58 (14.1%)	2.04 (1.09–3.85)*
Abnormal	2 (2.7%)	8 (1.9%)	1.74 (0.35–8.76)
Prosocial score [‡]	6.86 ± 2.20	7.50 ± 1.92	0.012 ^{§**}
Borderline	8 (11.0%)	21 (5.1%)	1.77 (0.73–4.26)
Abnormal	9 (12.3%)	26 (6.3%)	1.80 (0.79–4.10)
Total SDQ score [‡]	11.74 ± 4.53	10.85 ± 4.70	0.160 [§]
Borderline	10 (13.7%)	54 (13.1%)	1.22 (0.58–2.61)
Abnormal	4 (5.5%)	14 (3.4%)	1.99 (0.60–6.54)

[†] Gender adjusted odds ratio (AOR) and 95% confidence interval (95% CI)

[‡] Data expressed as mean score ± standard deviation

[§] Student *t*-test *P*-value

* *P* < .05

** *P* < .01

Association Between Internet Gambling and Problematic Internet Use

With regard to problematic internet use, adolescents who participated in internet gambling had higher mean YIAT scores (see Table 1). It is noteworthy that approximately one quarter of adolescents who participated in internet gambling concomitantly reported problematic internet use. Moreover, this group was 1.81 times more likely to report problematic internet use as compared to the control group (see Table 2). In addition, the frequency of problematic internet use among infrequent internet gamblers was 15.0% ($n = 6$), while among frequent internet gamblers was 36.4% ($n = 12$). The mean YIAT scores did not differ between adolescents with infrequent internet gambling and the control group (mean score \pm SD, 32.87 ± 12.84 vs. 30.50 ± 11.86 , $P = .244$). In contrast, adolescents with frequent internet gambling had significantly higher mean YIAT scores (mean score \pm SD, 32.87 ± 12.84 vs. 30.50 ± 11.86 , $P < .0001$). Furthermore, adolescents with frequent internet gambling were in excess of three times more likely to concomitantly present with problematic internet use (AOR = 3.36; 95% CI: 1.60–7.05).

The multivariate regression analyses conducted indicated that the most prominent independent factor associated with problematic internet use among the study population was internet gambling (see Table 4). In addition, utilizing the internet for the purposes of interactive game-playing and social communication, including chat-rooms and correspondence were also independently associated with problematic internet use. It is noteworthy that neither the locations of internet access nor extended history of internet use were associated with problematic internet use among the study population.

Discussion

The present study assessed the prevalence, correlates, and psychosocial implications of internet gambling among adolescents. Moreover, the current study evaluated the association between internet gambling and problematic internet use. The study findings indicated that $\sim 15\%$ of the adolescent study population participated in internet gambling. The prevalence rate of internet gambling among Greek adolescents is observed to be greater than those reported among other European adolescent populations (Hardoon et al. 2004; Molde et al. 2009; Moodie and Finnigan 2006). This may in part be attributed to the particular socio-cultural context of the region which legally permits gambling among adults, thus diminishing potential social barriers among adolescents to participate in gambling practices both within and beyond the internet medium. Moreover, the study

Table 4 Multivariate regression analysis for the independent factors associated with problematic internet use among adolescents

	β	Standard error (SE)	Odds ratio (95% confidence interval)
Internet gambling	1.23	0.45	3.43 (1.40–8.39)**
Internet use for the purposes of chat-room use	0.94	0.31	2.57 (1.41–4.68)**
Internet use for the purposes of game-playing	0.75	0.34	2.12 (1.09–4.10)*
Internet use for the purposes of e-mail	0.65	0.32	1.92 (1.04–3.57)*

* $P < .05$

** $P < .01$

findings indicated that the prevalence rates of infrequent and frequent internet gambling were 8.3% and 6.8%, respectively. The observed prevalence rate of frequent internet gambling among Greek adolescents is similar to that observed among young adults in the U.S.A. (Petry and Weinstock 2007).

In addition, the study findings indicated that male adolescents were more likely to participate in internet gambling as compared to their female counterparts. This finding is in accordance with that already established in the literature indicating that more males than females gamble online (Dickson et al. 2002; Griffiths et al. 2009; Molde et al. 2009). While the observed gender differences regarding internet gambling may have also been confounded by the fact that adolescent females are less likely to frequently utilize the internet (Tsitsika et al. 2009a), particularly for purposes other than social communication (Tsitsika et al. 2009b), the present study findings examined the correlates of internet gambling following gender adjustment.

With regard to the psychosocial implications of internet gambling practices, the study findings showed that such behavior is associated with significant conduct problems. The evidence provided corroborates with related findings in the literature (Hardoon et al. 2004) indicating that adolescents who gamble on-line tend to engage in aggressive (Ko et al. 2009) and/or criminal behavior, as well as school truancy (Stitt et al. 2000). In addition, according to the study findings, internet gambling is associated with significant peer problems and impaired social skills among adolescents. Similarly, previous research findings have indicated that adolescent gambling is associated with both social isolation and the deterioration of social relationships (Messerlian et al. 2005). However, it remains unclear whether such behavioral and social characteristics may have predisposed adolescents to initiate gambling practices or whether time allotted to gambling behavior has resulted in the manifestation of the aforementioned characteristics.

Even so, the present study findings revealed that internet gambling was not associated with comprehensive emotional and psychosocial maladjustment among adolescents. These findings contrast those established in the international literature indicating that emotional symptoms, such as depression and suicidal ideation, have been associated with internet gambling (Bakken et al. 2009; Messerlian et al. 2005). It is posited that the observed findings may be attributed to the fact that the surveyed adolescents may not exhibit comprehensive maladjustment secondary to either the limited time allotted to gambling practices and/or continued access to internet gambling, thus satisfying their impulsive behavioral patterns. However, it is upheld that a potential future escalation of time allotted to gambling behaviors may detrimentally impact factors as diverse as the quality of social relationships and school performance of adolescents.

The study findings indicated that the most significant independent factor associated with adolescent problematic internet use was internet gambling. Moreover, the findings indicated that the likelihood of problematic internet use was particularly elevated among adolescents who participated in frequent internet gambling. While an association between internet gambling and pathological gambling appears to exist, a causal relationship between the former and problematic internet use has not yet been established (Griffiths 2003; Wölfling et al. 2009). Internet gambling may provide a unique interface which facilitates the development of gambling problems (Griffiths 1999, 2003; Griffiths and Parke 2002; Griffiths and Wood 2000; La Rose et al. 2001). It is also plausible that some pre-existing problem gamblers may more readily adopt this accessible medium for the purposes of gambling. Even so, while it has been established that the internet may be utilized as a means for exhibiting either impulsive or addictive behavioral patterns, such as those of gambling or problematic internet use (Recupero 2008; Sun et al. 2009), as well as

multiple addictive disorders (Pallanti et al. 2006), neither the concomitant presentation nor potential etiological association between internet gambling and problematic internet use have been elucidated.

According to the present study findings, adolescents who participate in internet gambling practices are at enhanced risk for concomitantly presenting with problematic internet use. Therefore, the study provides evidence that adolescents may potentially exhibit multiple addictive behaviors secondary to the nature and scopes of internet sites accessed. However, it is also upheld that problem internet gambling may potentially confound the development of problematic internet use. Additional longitudinal studies are necessary in order to elucidate the etiological association between internet gambling practices and the development of problematic internet use among adolescents.

The strengths of the present study include that it assessed the prevalence, associated internet use characteristics, and psychosocial effects associated with internet gambling among adolescents. In addition, it evaluated the association between internet gambling, both overall and according to frequency of use, in relation to problematic internet use.

Due to the cross-sectional study design applied, the limitations of the study include its inability to ascertain the etiological association between internet gambling and both the psychosocial characteristics of adolescents and development of problematic internet use. The use of self-reported measures, as opposed to clinical interviews, as well as the inability to assess gambling practices in real-life gambling venues, may limit the interpretation of the study findings. Specifically, due to the measurement tools applied, underlying and/or concomitant mental health conditions, including the symptomatology of manic and/or hypomanic episodes, could not be assessed. Moreover, a misclassification bias may have been introduced since adolescents were comparatively assessed based on their reported frequency of internet gambling rather than their clinical presentation of problematic gambling in either real-life and/or on-line gambling venues. Finally, the evaluation of a homogeneous Greek study population may limit the generalizability of the study findings. However, it is upheld that the study findings may be generalized to other adolescents living in similar restricted environments with respect to legalized venues for gambling among minors.

In conclusion, the prevalence of adolescent internet gambling is markedly high, particularly among those populations prohibited from gambling practices in real-life gambling venues. Adolescent internet gambling is associated with both behavioral and social problems. Furthermore, the likelihood of concomitantly presenting with problematic internet use is greater among adolescent internet gamblers, particularly those who participate in such practices frequently. Finally, among all characteristics of internet use assessed, utilizing the internet for the purposes of gambling practices is the most prominent independent factor associated with problematic internet use among adolescents. Further prospective studies are necessary in order to evaluate whether internet gambling practices, including pathological gambling, constitute independent risk factors for the development of problematic internet use among adolescents.

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