Disconnect to Reconnect: Adolescents with Digital Media Overuse in Outdoor Behavioral Healthcare

Cullom Cahill BA and Tara Stireman MSW
Elements Wilderness Program

Abstract

Digital media overuse is a growing concern in a world increasingly dependent on technology. Mental health professionals seek effective treatment modalities for adolescents believed to be struggling with this issue. The objective of this study is to understand if Outdoor Behavioral Healthcare (OBH) has a similar positive impact on Youth Outcome Questionnaire (YOQ) scores of both students with and without digital media overuse. The sample studied was composed of attendees of an OBH program over a four-year period who had completed the Youth Outcomes Questionnaire (YOQ) at intake and discharge (n = 473). Therapists identified students according to the presence of Digital Media Overuse (DMO) or not (non-DMO). Our analysis found that, on average, both groups studied showed clinically significant improvements and reported YOQ total scores near or below the clinical cutoff at discharge. Further, no statistically significant difference in YOQ outcome scores was found between the two groups; indicating that both DMO and non-DMO participants benefited from OBH treatment and did not differ significantly in the positive effect experienced. These findings suggest that OBH is effective in producing positive mental health functioning outcomes, as measured by the YOQ, for students who may have digital media overuse issues.

Keywords: Internet Addiction, Digital media overuse, Problematic Computer Use, Treatment, YOQ, Wilderness Therapy, Outdoor Behavioral Healthcare (OBH), Therapeutic Outcomes, Adolescents

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Correspondence regarding this paper can be emailed to Cullom Cahill at cullom.cahill@gmail.com

DISCONNECT TO RECONNECT

Beginning in the 1990s, increased attention and writing has focused on adolescent technology use and concerns about the consequences accompanying the benefits of the digital age. Undeniable benefits from the rise of the digital age have been paralleled by possible negative consequences to society, specifically to adolescents. According to Twenge and colleagues (2019), there has been a steady increase in adolescent digital media use from 1976-2016, with a reported 4-6 hours of average daily use, as of 2016. This includes time on the internet, gaming, texting, video viewing and visiting social media sites. This cultural shift and the ubiquity of mobile handheld devices creates concern about adverse effects on society, especially high usage individuals. Although there is no universal term used to describe the cascading problems identified with too much technology use, many suggested terms have been put forth in the literature. Internet Addiction was first proposed by Young (1998) and modeled after diagnostic criteria for Pathological Gambling. Since then, a variety of terms such as Problematic Internet Use (Spada, 2014), Internet Addiction (Young, 1998), Compulsive Internet Use (Greenfield, 1999), and Digital Overuse (Montag & Walla, 2016) have been used to describe a burgeoning modern phenomenon that is clinically relevant and deserving of increased attention. In this article, we will primarily use the umbrella term Digital Media Overuse (DMO) to encompass all types of excessive or compulsive behaviors associated with digital media use. Digital Media Overuse better represents a wide range of different digital activities involving all types of media and mass communication regarded collectively, not only on the internet.

Classifying a New Disorder

The American Psychiatric Association has included Internet Gaming Disorder (IGD) under the "Conditions for Further Study" section of the DSM-5 (American Psychiatric Association, 2013). Due to its similarities with substance related and addictive disorders, IGD is proposed to be included with Gambling Disorder as a non-substance related disorder. Although IGD is a tentative disorder not intended for clinical use, defining this phenomenon offers consistent language for clinicians and researchers, while also highlighting the need to clarify diagnostic criteria, prevalence, and treatment. A key component of IGD

includes the persistent and recurrent use of video games leading to significant impairment or distress. While criteria for IGD are similar to the DSM-5 Substance Use Disorders, Substance Use Disorders require a minimum of only two of the eleven criteria to be considered a disorder while impairment or distress related to IGD requires a patient meet a minimum of five of the nine listed criteria within a 12-month period, making the threshold for IGD comparatively high. One large, international study of young adults indicated a prevalence of IGD in 0.3% to 1% of the sample and a potentially dysfunctional gaming prevalence of 2.4% (Przybylski et al., 2017). An earlier meta-analysis of pathological gaming indicated an overall prevalence of 3.1% (Ferguson et al., 2011). A large study of adolescents from primarily European countries found 1.6% of participants meet full criteria for IGD (Müller et al., 2014). The inclusion of IGD in the DSM-5 as a condition meriting further study establishes diagnostic criteria consistency and serves as a starting point to develop consensus on one type of digital media overuse.

In the latest edition of the International Classification of Diseases, 11th revision (ICD-11), the World Health Organization (WHO, 2018) included Gaming Disorder (GD) as a disorder due to addictive behaviors. To qualify for a diagnosis of GD, a person must display three symptoms including impaired control, increased priority to gaming that takes precedence over other interests or activities, and continuation or escalation of gaming despite negative consequences. Gaming must result in marked distress or significant impairment in important areas of functioning for at least 12 months. Criteria such as withdrawal and tolerance are not included in the definition of Gaming Disorder (World Health Organization, 2018). Since Young's (1998) initial formulation of Internet Addiction, most attempts at conceptualizing, understanding, assessing, and treating have been adapted from substance and behavioral addiction studies. The introduction of IGD and GD to two widely recognized professional sources has further validated the field of study and level of concern.

The APA (2013) and the WHO (2018) identify gaming as the single focus of IGD and GD; excluding excessive use or the inability to control use of other digital media technologies such as social media,

texting, video viewing, shopping, and pornography. There is currently no widely recognized diagnosis to encompass multiple types of digital media overuse. In one recent meta-analysis, researchers identified 65 studies using varying definitions and measurements of digital media overuse (Dahl & Bergmark, 2020). Another study, which reviewed interventions for adolescents with internet addiction, included six studies, each using different diagnostic tools and criteria (Malinauskas & Malinauskiene, 2019). Dienlin and Johannes (2020) described digital technology use as an umbrella term and highlighted the complexity of the topic, the different forms, the functionality, and types of use, along with explaining the lack of consensus on a definition of overuse. Despite this lack of consensus on diagnostic criteria, there is wide agreement that adolescent digital media overuse is a problem. A definition of addiction put forth by Heather (2016) incorporates the most basic features of the concept:

> "a struggle in which one keeps having trouble quitting a repeated behavior, despite awareness of harmful consequences, and where repeated behavior is guided by disordered choice; positioned somewhere in between the voluntary and involuntary, coming both from inside the individual and as a reaction to external structures" (p. 426).

Elements frequently found in describing and understanding the problem of digital media overuse often include preoccupation, prioritizing, mood altering effects, trouble limiting use, negative consequences, compulsive use and deception, and tolerance and withdrawal. Many studies highlight the lack of a common definition and agree on the necessity of developing consensus on the definition of this developing issue.

Problematic Internet Use (PIU), Digital Media Overuse, and addiction are widely written about, yet prevalence rates of these issues vary greatly due to the lack of a common definition and methodology. Studies incorporate multiple different assessment tools and varying sample groups, which creates problems predicting and understanding the prevalence of digital media overuse in adolescents. In a review by Dahl and Bergmark (2020) which focused on prevalence and change over time,

the authors concluded prevalence findings are scattered and should be interpreted and compared with caution due to the lack of consensus regarding methods and definitions. Mihara and Higuchi (2017) found prevalence rates to range from 0.7% to 27.5%. Other recent meta-analysis and reviews verify the prevalence of DMO as hard to assess, ranging from 1% to 26.8%, and dependent on age, culture, and geographic location (Dahl & Bergmark, 2020; Dienlin & Johannes, 2020; Pluhar et al., 2019; Sussman et al., 2018).

Alongside DMO, other co-occurring disorders such as autism, ADHD, depression, and substance use exist. The discussion surrounding causation or correlation of these co-occurring disorders is highly debated and overall unanswered. Some describe the relationship between DMO and comorbidities as a vicious cycle with no clear cause and effect order: digital media overuse exacerbates other issues in an individual's life and life's problems lead to increased digital media use to manage problems or escape them (King & Delfabbro, 2018a). In a meta-analysis and literature review, Dahl and Bergmark (2020) concluded that PIU tends to be associated with anxiety and depressive symptoms and other co-occurring disorders and social difficulties. While the correlation between PIU and associated co-occurring disorders seems to be well documented, the source of causation is unclear and may be best understood in terms of circular causality which focuses on the reciprocal relationship between two events. In a recent review, depressive disorders were the most frequent co-occurring disorders with internet and video game addiction. The prevalence of internet and video game addiction is higher in adolescents with comorbid impulsivity, ADHD, and autism spectrum disorders (Sussman et al., 2018). In a systematic literature review, Mihara and Higuchi (2017) concluded that co-occurring psychiatric disorders are common and act as both risk factors for and consequences of IGD. Similar to later studies, the researchers highlighted ADHD as a risk factor; while sleep problems, depression, social and school dysfunction may more likely be consequences.

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OBH Model

Outdoor Behavioral Healthcare (OBH), previously referred to as wilderness therapy or adventure therapy, is often an alternate approach to traditional residential care used for adolescents with co-occurring mental health conditions. Programs vary in length and model and participants often have prior mental health treatment experiences (Bettmann et al., 2016). A key feature of OBH is "the prescriptive use of wilderness experiences by licensed mental health professionals to meet the therapeutic needs of clients" (Gass, 2014, p. 1). According to Gass (2014), the main components of OBH include:

- Extended backcountry travel and wilderness living experiences long enough to allow for clinical assessment, establishment of treatment goals, and a reasonable course of treatment not to exceed the productive impact of the experience.
- Active and direct use of clients' participation and responsibility in their therapeutic process.
- Continual group living and regular formal group therapy sessions to foster teamwork and social interactions.
- Individual therapy sessions, often supported by the inclusion of family therapy.
- Adventure experiences utilized to appropriately enhance treatment by fostering the development of eustress (i.e., the positive use of stress) as a beneficial element in the therapeutic experience.
- The use of nature in reality as a metaphor within the therapeutic process.
- A strong ethical base of care and support throughout the therapeutic experience.

There is growing outcomes-based research demonstrating the effectiveness of OBH for adolescents. Recently, Gass et al. (2019) compared treatment as usual (TAU), no structured treatment (NST), and OBH for post-acute adolescents diagnosed with a substance use disorder and a comorbid diagnosis. TAU consisted of clinical recommendations to

more traditional forms of outpatient care, intensive outpatient, and residential care. Students in OBH demonstrated more significant outcomes than TAU. Another study using a TAU comparison group strengthened findings, showing significantly better rates of change for adolescents completing an OBH program when compared to those in the TAU group. While both groups in this study demonstrated significant improvements from admission to discharge, treatment gains from one-year post treatment were three times larger in the OBH group (DeMille et al., 2018). In a meta-analysis by Bettman et al. (2016), researchers found medium-sized effects after participation in OBH programs in six areas: self-esteem, locus of control, behavioral considerations, personal effectiveness, clinical measures, and interpersonal measures. A slightly earlier study by Tucker and colleagues (2014), highlights OBH as effective for adolescents with a variety of presenting problems, complexities, and co-occurring diagnoses. These studies continue to support the evidence that OBH is a viable and effective option for adolescents experiencing a variety of co-occurring mental health and substance use concerns. Data consistently shows improvement for youth, reducing symptoms of distress and effectiveness to improve overall function.

Methods

Data Collection

The data used in this study was collected between January 1, 2017, and March 30, 2021, from a privately funded OBH program licensed by the Utah Department of Licensing and accredited by the Association for Experiential Education. The OBH program administers the Youth Outcomes Questionnaire (YOQ) to its clients upon intake and at discharge. This program also administers this instrument to parents of the clients at each of those instances, with parents being instructed to fill out the questionnaire reflecting on their child. The differences between the intake and discharge YOQ scores were compared for both the client self-report and the parent completed questionnaires.

In addition to the two mentioned self-report measures, all clients and parents are also asked to fill out the NATSAP questionnaire, which is

used to collect client demographic data. Clients and parents are further asked to fill out forms consenting to the use of their data in research. The results reported in this paper comprise only the individuals who consented to the use of their data for research purposes.

At the completion of each client's stay, therapists complete a three-part discharge report, including a summary of the treatment, recommendations for future treatment, and a list of the clinical diagnoses along with their corresponding DSM code. The diagnosis data used in this report was collected manually from the discharge summaries of the participants. All participants had two or more listed diagnoses. The specific diagnoses listed on the discharge summaries were sorted into 10 diagnostic categories:

- Depression (including mood dysregulation disorder, adjustment disorder, bipolar disorder, and self-harm and suicidal behaviors).
- Anxiety (including OCD and eating disorders).
- Family Issues.
- Substance Abuse.
- ADHD (and other executive functioning deficits).
- ODD (conduct disorder, impulse control, disruptive behavior disorder).
- Learning Disorders (academic problems, developmental coordination, slow processing speed, and specific learning disorders).
- Trauma (developmental trauma disorder, trauma-related disorder, history of sexual abuse).
- Autism (autism, nonverbal learning deficits, neurodevelopmental disorder).
- Other (personality disorders, Tourette's disorder, and other neurodiversity, reactive attachment disorder, etc.).

Diagnosis data was collected for the entire sample of digital media overuse students enrolled from January 1, 2017, to March 30, 2021 (n = 75). Diagnosis data was also collected on a sample of students without

digital media overuse issues with discharge dates between February 11, 2019, and September 24, 2020, (n = 199).

To determine digital media overuse, therapists reviewed their student list from 2017-2020. Therapists identified students with "digital media overuse" if that student's interaction with technology prior to arriving to the program was preoccupying, excessive, interfered with functioning, hard to control, continued/increased despite negative consequences, and was a major contributing factor to their reason for being enrolled in the OBH program. These behaviors were reported by both parents and students. The two groups defined by this process will be referred to as digital media overuse (DMO) and non-digital media overuse (non-DMO) individuals.

Measures

The Youth Outcomes Questionnaire (YOQ) is a standardized clinical outcome instrument to measure treatment progress in youth populations receiving mental health intervention (Burlingame et al., 2019). The YOQ measures six factors that encompass the various issues adolescents struggle with (Ridge et al., 2009). These factors are: **intrapersonal distress (ID)**, which measures anxiety, depression, fearfulness, hopelessness and self-harm; **somatic (S)**, measuring physical and somatic distress a child or adolescent may be experiencing; **interpersonal relations (IR)**, relating to issues in a client's relationship with their family, adults and peers; **social problems (SP)**, assessing troublesome social behavior; **behavioral dysfunction (BD)**, relating to a client's ability to organize tasks, concentrate, handle frustration, etc. and; **critical items (CI)**, which describes issues which may need immediate inpatient services like suicidal thoughts or self-harming behaviors (Burlingame et al., 2019). The YOQ also provides a total score by aggregating each of the subscores. The range of total scores is 16 to 240. A higher score indicates a more severe condition. The YOQ provides a "clinical cutoff" to determine an individual's need for a clinical intervention. A score below the clinical cut-off indicates an individual in the normative range, while a score above the cutoff indicates an individual in need of a clinical intervention. The cut-off score for parent reports is

46, while the cut-off score for student self-report is 47 (Burlingame, et al., 2005).

A change that is statistically significant is not always considered clinically significant. Clinical significance is a measure of whether a treatment has a real, genuine, palpable, and noticeable effect on someone's life (Jacobson & Truax, 1991; Kazdin, 1999). The reliable change index (RCI) is the criteria used to evaluate if a clinically significant change has occurred. The RCI for the YOQ Youth Self Report is a change of 18 points, while the RCI for the YOQ Parent Report is a change of 13 (Burlingame et al., 2019).

Sample

Participants completed an Outdoor Behavioral Healthcare program accredited by the Association of Experiential Education. The program utilizes traditional forms of therapy, such as Cognitive Behavioral Therapy and Dialectical Behavioral Therapy, while immersing students in a backcountry wilderness setting. Participants experienced an expedition backpacking model and received mental health treatment, substance abuse treatment, and general health care services. The average length of the program is 10 weeks (M = 76.72 days, SD = 16.62).

The data set used in this analysis consists of students enrolled in the OBH program between January 1, 2017, and March 30, 2021 (n = 473). Each individual case will have scores reported by the student (n = 411), and/or by one or more of the parents (n = 463). For example, an individual case could have no student reported data, but two separate entries from each parent. Only survey responses with paired data points at both day of admission (DOA) and day of discharge (DOD), as well as verified consent forms, were included in the data set.

Of the 473 individual cases in the dataset, 67 students (14.16%) were identified as having digital media overuse and 406 (85.84%) were not. The overall mean age of the participants was 15.72. The mean age of the students identified as not having an overuse issue was 15.78, while the mean age of DMO students was slightly lower at 15.44 years old.

From the samples of diagnosis data described above, the percentage of students who fell into each of the ten diagnostic categories was calculated and is shown in Table 1. Since all participants have more than one co-occurring diagnosis, the total percentage will add up to more than 100% for each of the two groups.

Table 1

Presence of Comorbidities

Diagnosis	**Non-DMO** ***n* = 167**	**Non-DMO %**	**DMO** ***n* = 81**	**DMO %**
ADHD	101	60.48	60	74.07
Anxiety	115	68.86	58	71.60
Autism	26	15.57	25	30.86
Depression	145	86.83	68	83.95
Family Issues	118	70.66	60	74.07
Learning	36	21.56	12	14.81
ODD	36	21.56	12	14.81
Substance Use	128	76.65	23	28.40
Trauma	35	20.96	9	11.11

Note. Table includes all participants surveyed in the time period specified, not just those with paired data points at admission and discharge.

Results

Paired t-test of Digital Media Overuse Outcome Scores

The average decrease in YOQ total scores for individuals deemed to have digital media overuse, when reported by both parents (M = -52.38, SD = 31.90) and students (M = -22.47, SD = 33.87), was found to be statistically significant; (parents: $t(73) = 14.13$, $p < .001$, and students: $t(59) = 5.14$, $p < .001$) as well as clinically significant because both the change means fall within the parameters of the Reliable Change Index. Cohen's d was calculated to measure effect size. This test indicated a large effect size for parent DMO scores (d = 1.68, 95% CI [1.32, 2.05]) and a medium effect size for student scores (d = 0.75, 95% CI [0.42, 1.08]).

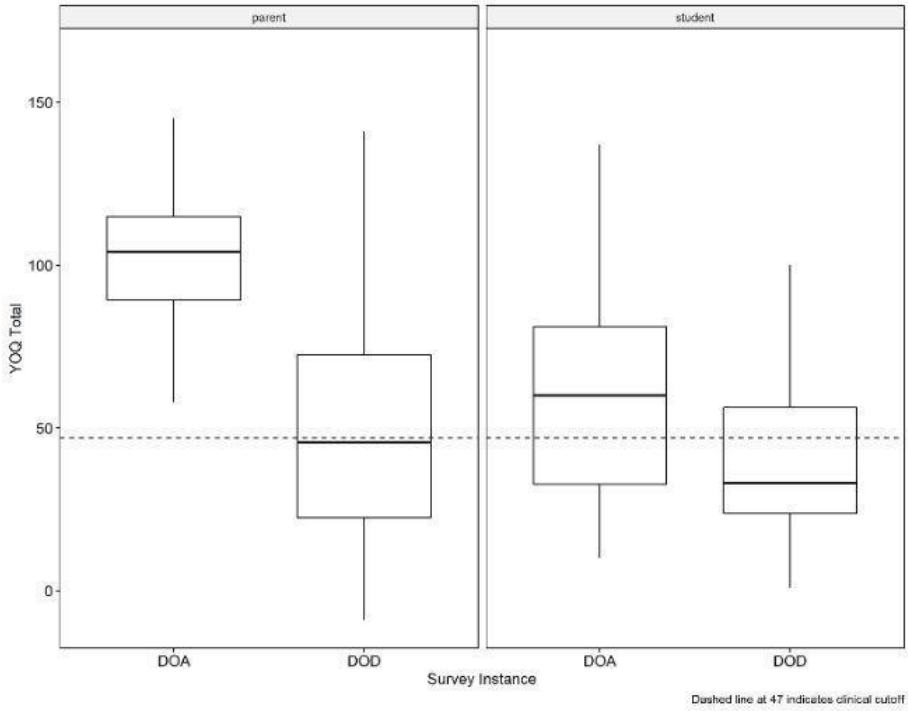
Figure 1 shows paired data of parent (n = 74) and student (n = 60) reported YOQ total scores of participants with digital media overuse issues at day of admission (DOA) and day of discharge (DOD). At the time of discharge, the mean total score for students was below the cutoff score of 47 (M = 39.08, SD = 25.31), but slightly above the cutoff for parents (M = 50.09, SD = 34.91). However, the median score for both groups was below the cutoff as indicated in Figure 1.

Paired t-test of non-Digital Media Overuse Outcome Scores

The average decrease in YOQ total scores for the individuals who were not deemed to have digital media overuse for both parents (M = -53.86, SD= 36.66) and students (M = -21.48, SD = 34.28) was found to be statistically significant; (parents: $t(388) = 28.97$, $p < .001$, and students: $t(350) = 11.74$, $p < .001$). Further, the mean decrease of both parents and students met the parameters of the Reliable Change Index indicating clinical significance as well Cohen's d indicated a large effect size for non-DMO parent scores (d = 1.77, 95% CI [1.57, 1.96]) and a medium effect size for student scores (d = 0.68, 95% CI [0.56, 0.81]). Figure 2 shows paired data of non-digital media overuse participants from both parent (n = 389) and student (n = 351) reported YOQ total scores at day of admission (DOA) and day of discharge (DOD).

Figure 1

Digital Media Overuse Outcomes, Parent and Student



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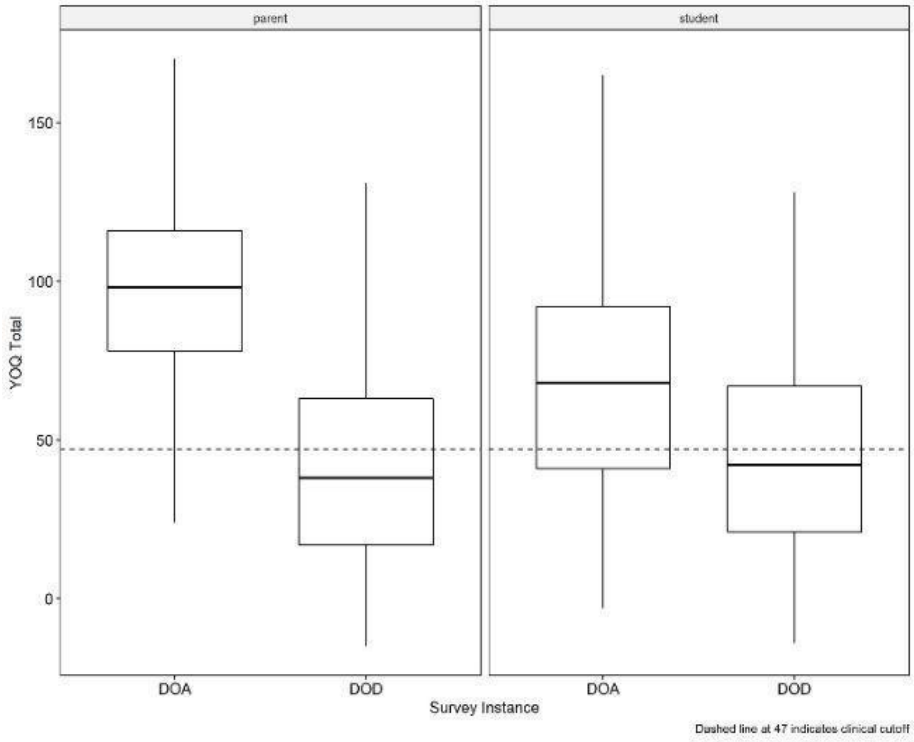
389) and student (n = 351) reported YOQ total scores at day of admission (DOA) and day of discharge (DOD).

Figure 2

Non-Digital Media Overuse Participant Outcomes



The change in mean scores for both parent and student reported scores of DMO and non-DMO individuals indicates that the Outdoor Behavioral Healthcare intervention on average benefits all groups of participants (Table 2). This significance holds true for both self-reported student scores, as well as parent scores reporting on their child. The only group that had a mean discharge score above the clinical cutoff was parents of DMO students (M = 50.09). While this group experienced significant improvement through the program (a mean change of -52.38 points), this result may partially be because this group entered with the highest YOQ total mean score of any group (M = 102.47, SD = 25.07).

Table 2

Outcome Scores and Comparisons for DMO and Non-DMO participants

	n	Mean Discharge Score	Clinical Cutoff	Mean Change	RCI
DMO Parent	74	50.09	46	-52.38	-13
DMO Student	60	39.08	47	-22.47	-18
Non-DMO Parent	389	43.19	46	-53.86	-13
Non-DMO Student	351	46.15	47	-21.48	-18

Table 3

Youth Y-OQ Self Report Total Score

Change Category	Reliable Improvement	No Reliable Change	Deterioration
Y-OQ-SR Change	**18 or more**	**1-17**	**0 and below**
	% (*n*)	% (*n*)	% (*n*)
DMO	53.33 (32)	25.00 (15)	21.67 (13)
Non-DMO	53.56 (188)	18.23 (64)	28.21 (99)

Table 4

Parent/Guardian Y-OQ Total Score

Change Category	Reliable Improvement	No Reliable Change	Deterioration
Y-OQ Change	**13 or more**	**1-12**	**0 and below**
	% (n)	% (n)	% (n)
DMO	82.43 (61)	10.81 (8)	6.76 (5)
Non-DMO	82.01 (319)	12.34 (48)	5.66 (22)

Independent t-test of DMO and non-DMO Student Reported Outcome Scores at Admission and Discharge

After running a series of Welch two sample t-tests, the difference between individuals with digital media overuse (parent $n = 74$, student $n = 60$) and individuals without digital media overuse (parent $n = 389$, student $n = 351$) was found to not be statistically significant at any of the following instances: parent scores at admission ($t(107) = -1.69$, $p = .094$), student scores at admission ($t(79) = 1.31$, $p = .193$), parent scores at discharge ($t(100) = -1.57$, $p = .120$), or student scores at discharge ($t(90) = 1.94$, $p = .056$). This indicates that the Outdoor Behavioral Healthcare intervention had the same impact, statistically, on both groups of students.

Further, to achieve a more in-depth understanding of how the two groups were affected by the treatment, reported scores were placed into groups determined by their pre-treatment/post-treatment change score: reliable improvement, no reliable change, and deterioration. Student Y-OQ-SR scores are recorded in Table 3, while parent Y-OQ scores are recorded in Table 4. A chi-squared test of independence showed there was not a significant association between the distribution of change scores and

DMO status for either student scores, X2 (2, $N = 411$) = 2.02, $p = .36$, or parent scores, X2 (2, $N = 463$) = 0.25, $p > .88$.

Presence of comorbidities

As shown in Table 1, some diagnoses occur in similar proportions in both groups (depression, anxiety, and family issues) while others are different. A chi-square test of independence showed that there was a significant association between diagnosis and DMO status, X2 (9, $N = 248$) = 28.39, $p < .001$. Notably, the presence of autism is almost twice as high in DMO students (30.86%) versus non DMO students (15.57%); ADHD is higher in DMO students (74.07%) versus non (60.48%); while substance abuse is much lower in DMO students (28.4%) versus non DMO students (76.65%). This finding is consistent with the existing body of research. Other research has found social problems and school problems to appear more frequently in DMO individuals (Dahl & Bergmark, 2020; Mihara & Higuchi, 2017; Sussman et al., 2018). Due to these issues not being specifically measured in the available dataset, comparison is not possible in this study.

Discussion

This study found that treatment in an OBH program resulted in a positive change in mental health functioning for both participants with digital media overuse, as well as those without. For both DMO and non-DMO participants, parents of enrolled individuals, as well as the individuals themselves, reported clinically and statistically significant improvements when measured from the day of admission to the day of discharge. The mean change scores of all groups exceeded the minimum requirements of the Reliable Change Index. The only group which did not meet the clinical cutoff at discharge were parents reporting on digital media overuse students, who reported a mean total score of 50.09. However, DMO parents reported a very similar and significant change score to non-DMO parents (DMO $M = -52.38$, non-DMO $M = -53.86$), indicating that the program had a similar level of relative effect despite the DMO parents rating their adolescent slightly more severe at admission.

The difference in outcome scores between the overuse individuals and the non-overuse individuals proved to not hold statistical significance at any of the time points tested. This finding indicates that the OBH intervention is effective at improving general mental health functioning in adolescents with digital media overuse and adolescents without digital media overuse. A participant's digital media overuse status does not result in a significant difference in them experiencing a positive impact change, as measured by the YOQ due to the intervention.

Similarities to Existing Treated Diagnoses

One possibility for this result could be because OBH has been shown to be helpful to diagnoses that often co-occur with DMO, including mood disorders, ADHD, and autism. Similarities between digital media overuse and substance use disorders may also contribute to the observed result. Outdoor Behavioral Healthcare has been found to be effective for students with substance abuse issues. According to the National Institute on Drug Abuse (2018) and the Substance Abuse and Mental Health Services Administration (2020), substance use and its co-occurring issues are complex and require holistic treatment approaches that target the overarching and interdependent origins of such behavior.

Behavioral addictions, including DMO, are similar to substance use in this way, given that the presence of co-occurring mental health conditions is overall a rule rather than an exception. There is also no panacea when it comes to intervention, modality, or treatment plans for these complex issues. Correspondingly, treatment plans for behavioral addiction are often modeled after those for substance use disorders (Sussman et al., 2018). In a recent review, researchers concluded that despite limitations and criticism of the field, internet and video game addictions are both clinically relevant and overwhelmingly similar to substance use disorders (Sussman et al., 2018).

In addition to its similarities with substance use disorders, some researchers argue that the addictive use of the internet is most similar to Pathological Gambling disorder (Young, 1998). In the DSM-5 (2013), Pathological Gambling was moved from an impulse-control disorder and

is now categorized as an addictive disorder, under the diagnosis of Gambling Disorder (American Psychiatric Association, 2013). In a recent systematic review of Gambling Disorder findings from the National Epidemiological Survey of Alcohol and Related Conditions (NESARC), adult prevalence rates of 0.42% in the United States are reported with variability across some groups. Men have a slightly higher prevalence rate than women. Similar to substance use disorders, Gambling Disorder rarely exists independently without co-occurring problems and diagnoses (Loo et al., 2019). The findings from Loo et al. (2019) support a prior reported prevalence rate of 0.6% for Pathological Gambling. Variability was also found in the sub-groups studied, showing young men to have higher prevalence rates. Overall, when Pathological Gambling was detected, there was a consistent finding of mental health and substance use disorder diagnosis comorbidities present (Kessler et al., 2008).

Prevalence rates of Gambling Disorder are potentially comparable to current rates of digital media overuse. Those affected by Gambling Disorder follow treatment protocols that parallel substance use disorders. If Internet Gaming Disorder continues to be included as a non-substance behavioral addiction, like Gambling Disorder, digital media overuse is likely to be approached in the same way. As a relatively new field, DMO displays considerable overlap as a non-substance behavioral addiction. Therefore, when combined with the growing body of evidence supporting OBH as beneficial when treating substance use disorder (Gass et al., 2019), it is not surprising that the results of this study show that OBH is an effective treatment to improve mental health functioning of individuals struggling with digital media overuse or a behavioral addiction to internet or technology use.

Benefits of Treatment Outdoors

Another potential reason for the improved mental health functioning of DMO individuals seen in this study relates back to the vicious cycle described earlier: an individual's overuse of digital media can have a negative impact on their mental health functioning, which in turn leads to increased overuse. Conversely, life problems or mental health issues can lead to increased digital media use. Engagement in an OBH

program breaks this cycle by preventing all digital media use, except in therapeutically appropriate medical appointments or family therapy. Further, the experience of OBH students being disconnected from all digital devices may intrinsically foster a reconnection to oneself and to others (Gass et al., 2012). A period of abstinence or digital detox can support assessment and potentially be part of a larger, integrated intervention. A digital detox could also be useful as an intervention to interrupt unrestrained or poorly controlled digital media use. Abstinence or detox may reduce negative impacts caused or correlated with digital media overuse and interrupt the vicious cycle, thus allowing a student the opportunity to enhance insight, and learn and practice coping skills, while receiving therapeutic support.

In a review by Fernandez et al. (2020), researchers highlight the differences in short- and long-term abstinence and argue that short term abstinence does offer promise as an intervention for some problematic behaviors. The researchers stated a cautiously optimistic conclusion of the potential positive effects of short-term abstinence as a specific or integrated intervention for behavioral addictions with the strongest evidence being found when applied to mobile phone, social media, gaming, and pornography use. Increasingly, controlled use rather than long term abstinence, is becoming the dominant recommendation in the field of behavioral addiction (Fernandez et al., 2020). Similar to other behavioral addictions, digital media overuse and long-term abstinence is likely unrealistic for most, and arguably not possible, in a world increasingly reliant on technology, especially with the identifiable benefits to health and day-to-day living of digital media use. The impact of intentional, short-term abstinence from behavioral addictions is largely underrepresented in the literature when compared to substance related addiction and abstinence.

Limitations

There are several limitations to this exploratory study. Many limitations mirror criticism already present in the field. These criticisms include a lack of consensus in the definition, assessment, and etiology of digital media overuse as a diagnosis and consequently a difficulty in

consistently identifying its prevalence in adolescent participants across research studies. In order for research in this field to develop, consensus must be reached regarding the above-mentioned items. This study is further limited by the subjective, post hoc method used to identify DMO students. Although the level of involvement each therapist has with their clients increases the likelihood of this being a useful assessment, it is not an unbiased or standardized rating of digital media overuse. A significant limitation to this approach was that it was not possible to measure the severity of DMO in the sample studied. This left the researchers with the useful, but limited, binary definition of DMO being either present or not present. It would be useful to administer a standardized measurement tool, such as the Internet Addiction Test (IAT), to unbiasedly assess which individuals suffer from digital media overuse, as well as differentiate between the different types of problematic technology usage. The authors suggest OBH programs begin to collect data from a measurement tool such as the IAT. This will be valuable information to have as adolescent digital media overuse is likely to increase. Although this limitation is significant, it does not invalidate the findings of this study.

In addition, this study used data from only a single OBH program and is not representative of the entire field of OBH, nor is it a representative sample of adolescents. More broad reaching studies will only be possible if OBH programs begin to use standardized measurement tools to collect data on presence and severity of digital media overuse issues within the population they work with. Also, this study only tracked data from admission to discharge. A longitudinal study that accounted for data points at six months and one year post discharge would offer insights into whether the impact measured was sustained. Longitudinal data would be particularly important to verify parent YOQ scores. A significant limitation with only utilizing admission and discharge data is when parents fill out the discharge YOQ, they have likely only had minor interactions with their child and have not yet experienced the child settling into their home or next setting.

The diagnosis data reported in Table 1 did not include the entire available data set of non-DMO students. This diagnosis data was time intensive to collect because it required manually reviewing each student's

discharge summary. The researchers were only able to gather diagnosis data for 167 of the entire 473 individuals in this manner. Although diagnosis data is also collected on the NATSAP staff questionnaire at intake, this survey only collects information on primary and secondary "reasons for referral". The authors chose to not use this data source for three reasons. First, the "reasons for referral" do not necessarily reflect actual diagnoses assessed by trained mental health professionals. Second, this survey only collects information upon a student's arrival in the program and frequently does not show a true representation of their diagnostic profile after assessment. And finally, only two diagnoses are collected while some students have up to 10 diagnoses reported on their discharge summary. Using diagnosis data from the NATSAP questionnaire would significantly limit and alter understanding of the interplay of comorbidities.

Further, the assessment of mental health functioning used, the YOQ is dependent on self-report of the participants. Self-report is limited by individuals reporting a biased view of their own experiences. Evidence for this can be seen in the difference between the scores reported by students of their own experience and by parents of their child's experience. One way the data from the YOQ survey cuts down on this bias is by collecting data from the parents as well as the students. The combination of these two scores can hopefully provide a more accurate depiction of outcome scores for these participants despite the aforementioned limitation on parents' YOQ discharge scores.

Conclusion

As technology becomes an increasingly integral aspect of society, concerns about the impact it may have on people's well-being follows. This may be particularly true for adolescents and adolescent development. In order to respond to this burgeoning trend, the field of adolescent mental health care must work to establish a consensus on the definition and understanding of digital media overuse. Additionally, it is important to identify potential treatment options for adolescents that develop issues related to technology and digital media overuse. The results of this exploratory study show adolescent boys with DMO experience a similar

level of improvement in the mental health items measured by the YOQ as adolescent boys without DMO after participating in an Outdoor Behavioral Healthcare program. Further information is needed to understand if the positive impact measured is sustained by the client after discharge, as well as if OBH directly impacts the specific issues associated with digital media overuse.

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