

Numerous barriers exist when attempting to provide culturally-appropriate substance use disorder (SUD) treatment to persons who are deaf or hard of hearing (deaf). These include a lack of accessible community-based treatment providers, a low geographic census of deaf persons who are referred to treatment at any given time, difficulties in maintaining anonymity for deaf individuals in treatment, minimal alternatives for accessible self-help support groups, and a general lack of information about SUD and deafness by SUD treatment and deaf service providers (Feldman & Gum, 2007; Guthmann & Blozis, 2001; Moore et al., 2009; Moore & McAweeney, 2006; Pereira & Fortes, 2010; Scheier, 2009; Wilson & Wells, 2009). Since 2008, the Deaf Off Drugs and Alcohol (DODA) program has provided culturally appropriate cessation and recovery support services via a telemedicine program to deaf individuals who are clinically diagnosed with a SUD. DODA is a collaborative effort among the Substance Abuse Resources and Disability Issues (SARDI) Program in the Boonshoft School of Medicine at Wright State University, the Consumer Advocacy Model Program in Dayton (Montgomery County, Ohio), the Deaf Community Resource Center Communication Service for the Deaf (CSD) of Ohio, and the Ohio Department of Alcohol and Drug Addiction Services (ODADAS).

In 2011, SARDI received a field-initiated research grant from the National Institute on Disability and Rehabilitation Research (NIDRR) to evaluate whether or not an online SUD treatment program was an effective way to serve the deaf population with substance use disorders (SUD). The NIDRR project was based on the premise that a technology-assisted e-therapy SUD treatment program was an effective way to serve the deaf population, which is largely technologically savvy, widely dispersed geographically, and underserved (and often unserved) due to communication and other cultural barriers. The ultimate goal was to establish a culturally appropriate, evidence-based e-therapy practice that would serve as the gold standard for SUD treatment for deaf people.

Substance Abuse in the Deaf Population

Prior research estimates that, in the United States, there are approximately 1 million deaf individuals and 10 million hard of hearing people (Mitchell, 2006). There has been a great deal of speculation about elevated SUD prevalence rates among deaf and hard of hearing individuals, beginning in the 1970s. Alexander Boros (1979), a pioneer in the field of substance abuse and disability, speculated that stigma, fear, and misunderstanding contributed to a higher prevalence rate of alcoholism within this population. He also was the first clinician and researcher to identify the treatment needs of this population (Boros, 1980). In spite of this concern being voiced more than three decades ago, progress in defining the extent of the problem or in establishing appropriate services has been painfully slow.

Since that time, numerous researchers have speculated on the prevalence of SUD among deaf people, often in the absence of hard data on the extent and scope of the problem (Berman et al., 2010; Boros, 1979, 1980; Buckley, 2001; Ferrell & George, 1984; Gorey, 1979; Guthmann et al., 1993; Isaacs et al., 1979; Lane, 1989; Lipton, 1997; Moore & McAweeney, 2007; Sylvester, 1986; Worden, 1994). Buss and Cramer (1989) determined that alcoholism rates were much higher among persons with disabilities than in the general population, and this included individuals who were deaf. Over 100 deaf individuals responded to a kiosk-based survey in the eastern U.S., and it was found that alcohol abuse rates were similar and drug use rates were

lower in comparison to the general population (Lipton et al., 1997). More recently, Berman and colleagues surveyed over 800 deaf and hard of hearing high school students and found lifetime use rates for alcohol and other substances to be as high or higher than those for hearing youth (Berman et al., 2010, Guthmann, 2011). However, others have made the point that the sub-population within the deaf community with the highest SUD prevalence rates are highly unlikely to respond to any surveys due to social isolation and language barriers (Guthmann, 1995).

Data on SUD treatment for persons who are deaf is difficult to extrapolate, in part because there have not been adequate discussions at the state and national levels about substance use disorder and the impact it has on individuals in the deaf community. It is speculated that a fear of social stigma about the co-occurrence of deafness and alcoholism is the reason (Boros, 1980; Rendon, 1992). Considering the few studies that have been done, it appears that substance abuse is a problem in the deaf community (Berman, et al., 2010; Boros, 1979, 1980; Buckley, 2001; Ferrell & George, 1984; Gorey, 1979; Guthmann & Sternfeld, 2013, Titus & Guthmann.; 2013, Guthmann, 2011; Guthmann, 1995; Guthmann et al., 1993; Isaacs et al, 1979; Kearns, 1989; Lane, 1989; Lipton, 1997; McCrone, 1994; Moore & McAweeney, 2006; Moore et al., 2009; Sylvester, 1986; Worden, 1994). Most professionals familiar with substance abuse and deafness identify a level of substance abuse that is at least equal to the traditional field estimate of 8% to 10% in the general population (Grant, et al, 1988; Moore & McAweeney, 2006). Despite increased need, deaf individuals have diminished access to substance use and mental health services due to numerous communication and cultural barriers (Guthmann & Graham, 2004; Pick, 2013; Pollard, 1998; Pollard & Barnett, 2009; Steinberg, Sullivan, & Loew, 1998).

The Case for Online Treatment and Recovery Services for Deaf Individuals with SUD

Many deaf people are exceptionally attuned to technology, and many have experience using text messaging, email, and other visual forms of communication. (McCarthy, 2010; Power, Power, & Horstmanshof, 2007, Power, Power, & Rehling, 2007; Pray & Jordan, 2010; Wilson & Wells, 2009; Zazove, Meador, Derry, Gorenflo, Burdick, & Saunders, 2004). This is because new technologies are rapidly adopted by members of the deaf community in order to save time and have better communication access. Thus, deaf consumers are likely to accept technology-based products and would benefit greatly from visually delivered technological services. This means that in general, less time may be needed to provide training on using technology. For example, it takes less than an hour for the SARDI staff to train a new deaf Alcoholics Anonymous (AA) sponsor in how to use videoconferencing software. Moreover, it is the experience of SARDI staff that deaf consumers show a great deal of tenacity when they run into computer problems or other technology glitches; they typically continue to work with SARDI staff, even if it takes hours, to get the technology up and running again because they need the technology to communicate remotely. An important means of communication in the deaf community, when not person-to-person, involves the use of a videophone, Skype, FaceTime or other visual communication modalities that are usually dependent on an Internet connection.

This study was conducted to assess whether an online SUD treatment program, such as DODA, is an effective way to serve the deaf population with SUD. The outcomes for deaf consumers who receive online SUD treatment from DODA were compared to the outcomes for deaf individuals who receive culturally appropriate residential SUD treatment at the Minnesota

Chemical Dependency Program for Deaf and Hard of Hearing Individuals (MCDPDHHI) or the Awakenings Program in California for deaf and hard of hearing individuals. MCDPDHHI is a specialized program for men and women designed to meet the communication and cultural needs of deaf and hard of hearing persons in SUD treatment. The program staffers at MCDPDHHI are fluent in American Sign Language (ASL) as well as knowledgeable about and sensitive to deaf culture, with treatment approaches modified to respect the linguistic and cultural needs of each individual. The program offerings include individual and group therapy, lectures, workshops, family therapy, recreational activities, grief group, comprehensive assessment services and aftercare planning. The program operates on a Twelve-Step philosophy and offers clients the opportunity to attend AA, Narcotics Anonymous or other Twelve-Step meetings within the facility as well as in the community. There are three levels of care offered for clients: Lodging Plus, which is residential and typically based on an average of 28 days with programming seven days a week; Outpatient, which is five days a week for six and half hours a day for a total of 20 days; and Phase II, which is required for local graduates of Lodging Plus or Outpatient and is 12 weeks in duration with programming scheduled one day per week for one and half hours. Awakenings is a fully accessible residential treatment program for people who are deaf or hard of hearing. Awakenings provides a 6- to 12-month residential treatment program delivered in ASL for Deaf men and women, and includes comprehensive needs assessment, individual and group counseling, treatment planning, case management, referrals, mental health therapy as needed, 12-Step peer support groups, recreational and social activities, discharge planning, and referral to permanent housing.

It was hypothesized that outcomes for consumers in the DODA program would not differ from outcomes for deaf individuals enrolled in specialized residential SUD treatment programs, which are more expensive than an outpatient program like DODA. The typical cost for outpatient SUD treatment is \$10,000 and residential SUD treatment ranges between \$20,000 and \$32,000, depending on the level of services needed. Thus, an effective online treatment program would not only address the barriers faced by deaf individuals with SUD, but also represent a significant savings for the consumer and society.

Method

Participants

The target population included deaf adults with SUD who were seeking treatment services at DODA and at two culturally appropriate residential treatment sites, in Minnesota (MCDPDHHI) and California (Awakenings Residential Program for the Deaf); the adults were invited to participate in this study before SUD treatment began. MCDPDHHI and Awakenings are designed to meet the communication and cultural needs of deaf and hard of hearing individuals in alcohol and drug abuse treatment. Programs like MCDPDHHI and Awakenings allow deaf substance abusers access to other deaf role models as well as counselors or psychologists who are either deaf or hearing and fluent in ASL. Specialized programs such as these also allow deaf people to be in programs with other deaf clients who share common, even cultural, experiences and can identify with each other.

A total of 95 deaf persons in treatment for SUD participated in this study: 42 in California (23 men, 28 women), 45 in Minnesota (28 men, 17 women), and 8 in Ohio (6 men, 2 women). In California, 12% were Native American, 5% were Asian, 10% were African American, and 73% were Caucasian. In Minnesota, 4% were Native American, 11% were African American, and 85% were Caucasian. In Ohio, 12.5% were African American, and the rest were Caucasian. Due to privacy concerns, no data were collected regarding the severity of each participant's addiction, although data regarding alcohol and drug use from the Addiction Severity Index was collected at baseline.

This study was approved by the Institutional Review Board at Wright State University. Each participant was asked to sign an informed consent document that was translated into ASL before enrollment in the study. All were treated in accordance with the ethical principles of the American Psychological Association.

Instruments

DODA's effectiveness was analyzed using five outcome measures: the Substance Abuse Screener in American Sign Language (SAS-ASL), Satisfaction with Life Scale (SWLS), Rosenberg Self-Esteem Scale (RSES), Beck Depression Inventory (BDI), and items on past 30 day substance use from the alcohol/drug portion of the Addiction Severity Index (ASI). All measures were administered before SUD treatment and six months after SUD treatment began.

Substance Abuse Screener in American Sign Language (SAS-ASL). This is the only SUD screening instrument that has been validated for use with the deaf. This 30-item instrument is a self-report screening instrument used to identify if adult deaf individuals have a high or low probability of being clinically diagnosed with a substance use disorder (Guthmann & Moore, 2007; Titus & Guthmann, 2010, Guthmann et al., 2012).

Addiction Severity Index (ASI). This diagnostic instrument has been demonstrated to validly and reliably measure outcomes associated with SUD in several populations (Butler, Budman, Goldman, Newman, Beckley, Trottier, & Cacciola, 2001; Leonhard, Mulvey, Gastfriend, & Shwartz, 2000; McLellan, Luborsky, O'Brien, & Woody, 1980; Moos, Finney, Federman, & Suchinsky, 2000; Rosen, Henson, Finney, & Moos, 2000); it has not been validated for use with deaf clients. For this study, the ASI was not used as a complete instrument. Instead, the chosen questions on the drug/alcohol use scale asked about substance use in the past 30 days (Questions D1 to D13).

Satisfaction with Life Scale (SWLS). This scale is a valid and reliable measure of happiness developed by Diener and colleagues (Diener, Emmons, Larsen & Griffin, 1985) and has been translated into ASL. SWLS is brief (five-item) and can be administered in interview, written, or Internet formats. The reliability and validity of this scale has been reported for deaf populations by a number of investigators (Gilman, Easterbrooks, & Frey, 2004; Harris, Anderson, & Novak, 1995; Hintermair, 2008; Leigh, 2009).

Rosenberg Self Esteem Scale (RSES). This 10-item, easy-to-score scale is the most widely-used self-esteem measure in social science research, and has been used with deaf

individuals. The scores on the RSES range from 0 – 30, with scores between 15 and 25 considered to be in the normal range and scores below 15 suggesting low self-esteem. Numerous studies have validated its use in deaf populations (Bat-Chava, 1993, 1994; Crowe, 2002; Edwards & Crocker, 2008; Singelis, Bond, Sharkey, & Lai, 1999).

Beck Depression Inventory (BDI). This 21-item self-report inventory permits measurement of the severity of depression and is one of the most widely used depression scales in healthcare settings for research and clinical purposes. Like the SWLS and RSES, graduate students working on thesis projects have translated the BDI-II into ASL for use with the deaf population, but to date, it has not been validated for use in this population (Leigh, Robins, & Welkowitz, 1988; Watt & Davis, 1991; Wilson & Wells, 2009; Yin, 2000).

Procedure

Prior to the start of SUD treatment, each participant completed the five selected instruments (SAS-ASL, SWLS, RSES, BDI and selected questions taken from the ASI in the format that the participant preferred (in English or ASL, written or signed, remote or in person). Six months after the start of SUD treatment, each participant was again asked to complete the five instruments in the format of their choosing. Some participants were still in treatment at that point, some had completed their treatment while others had dropped out of treatment. The intake and six-month follow-up scores on the five selected outcome scales were compared between deaf participants enrolled in the online DODA program and deaf participants receiving SUD services in specialized residential treatment settings for deaf individuals in an effort to determine whether the e-therapy DODA program was more or less effective than in-patient specialized SUD treatment for deaf individuals. Thus, a quasi-experimental design was utilized to compare the outcome measures obtained, pre-treatment and six months after the start of treatment, from deaf consumers at DODA with the same measures obtained from deaf clients receiving culturally-appropriate residential SUD treatment in CA and MN.

Results

A 3 x 2 (Site x Time) analysis of variance (ANOVA) was conducted for each of the five outcome measures, comparing the pre-enrollment scores with the six-month follow-up scores for the three sites (DODA, MCDPDHHI, and Awakenings). Because of the small sample size in the DODA program, the effects of age, gender, and race of the participants on outcomes was not analyzed.

For the SWLS measure, a significant difference between pre-enrollment and follow-up scores was detected overall for all sites ($F = 6.58, p = .017$), with participants reporting significantly more satisfaction with life at follow-up than at pre-enrollment. However, no significant difference between sites ($F = 0.27, n.s.$) and no significant interaction between Site and Time ($F = 0.89, n.s.$) was found.

For the RSES measure, the ANOVA revealed a significant pre-post difference in RSES scores ($F = 11.75, p = .002$), but no significant difference between sites ($F = 0.10, n.s.$) and no significant interaction between Site and Time ($F = 1.21, n.s.$). Participants reported significantly higher levels of self-esteem at follow-up compared to pre-enrollment.

Similarly, with the BDI, depression scores were significantly lower at follow-up compared to pre-enrollment for all participants ($F = 5.01, p = .034$). No significant difference between sites ($F = 0.64, n.s.$) and no significant interaction between Site and Time ($F = 1.40, n.s.$) was found.

The ANOVA for SAS-ASL revealed a nearly significant pre-post difference in SAS-ASL scores ($F = 3.93, p = .059$) but no significant differences between sites ($F = 2.79, n.s.$).

For the ASI, only data from the questions that asked for alcohol or drug use in the last 30 days (taken from questions D1 to D13) were analyzed. For most drugs, very few of the participants used those substances. For example, only 10% of the participants reported using opioids including heroin, and 16.7% abused methamphetamines or amphetamines; these numbers were too small for statistical analyses. With respect to alcohol intake, 66.7% of participants from Minnesota, 88.2% of participants from California, and 67.7% of DODA participants reported no alcohol intake in the past 30 days at follow-up ($\chi^2 = 1.99, n.s.$), suggesting that the online DODA program was as effective as the residential programs in reducing alcohol use.

Discussion

SUD treatment outcomes for deaf consumers who received treatment online in the DODA program did not differ from outcomes for deaf consumers in traditional, culturally appropriate in-patient treatment programs. This suggests that the online DODA program may be an effective option to use for some deaf clients. However, the absence of a significant difference in outcomes between DODA and residential SUD treatment consumers may be due to the lack of power (small n in the DODA group).

The most difficult problem to overcome in this study was the low incidence of deaf individuals with substance use disorders (SUD) in Ohio who were eligible for treatment in DODA. Persons eligible for treatment at the DODA program were restricted primarily to those persons eligible for Medicaid. In the three years of the project, only eight deaf consumers received SUD treatment in the DODA program. This severely limited the ability to collect data with enough power to test the effectiveness of the DODA program compared to in-patient SUD treatment programs for deaf individuals. To address the issue of low incidence of deaf consumers with SUD, program staff contacted referral sources across the state of Ohio on a daily basis to recruit deaf consumers in need of SUD treatment services. Because online SUD treatment services are offered, deaf consumers from anywhere in the state of Ohio could utilize DODA treatment and recovery services. However, due to the small numbers of deaf individuals who were eligible for Medicaid, the DODA program continued to have a small number of clients accessing the services.

The low density of deaf individuals in most geographic areas is a problem for many agencies that attempt to establish specialized programs for deaf consumers with SUD. It would be impossible to sustain a treatment program that serves less than ten deaf individuals over the course of three years. Fortunately for SARDI, its clinical arm serves consumers with a wide range of disabilities, and its counselors who are fluent in ASL (and who prefer to work with deaf consumers) are able to provide treatment and recovery services to consumers who are not deaf.

The ability to provide behavioral health services online to deaf individuals anywhere across the state enables the DODA program to reach a population of deaf consumers who might not be able to receive linguistically and culturally appropriate services in their own communities.

The decision to use a comparison group of deaf clients in residential treatment was made because the goal of the project was to learn if DODA is as effective than a more expensive residential treatment program designed for the deaf. A potential confound is that patients in residential treatment may have more serious addiction problems than those in out-patient treatment. However, SUD treatment is treated differently by states. In Ohio, the treatment philosophy is “least restrictive environment,” which means that out-patient SUD treatment is given to all but those most in need (those most in need are referred for inpatient services). In the Minnesota and California programs, the philosophy is that the best treatment approach to use for deaf persons with SUD is in a specialized residential program where treatment is culturally appropriate and communication is in ASL. Thus, both the clients in the deaf residential programs and the Ohio consumers at DODA receive culturally appropriate services in ASL. It was judged that a comparison group of deaf individuals in Ohio receiving traditional SUD treatment would not be appropriate because they would not receive adequate language accommodation in traditional SUD treatment programs. Therefore, participants in this research project were from two different populations, deaf individuals in Ohio who receive SUD treatment from DODA and deaf individuals who receive residential SUD treatment in Minnesota or California.

A larger study involving more states and more treatment sites that are utilizing e-therapy, especially sites less dependent on Medicaid funding, needs to be conducted. However, very few other online SUD treatment and recovery services are available nationally. The DODA program is limited to residents in the state of Ohio, given licensing laws for counselors, psychologists, and psychiatrists. Even so, DODA’s online 12-Step recovery program (available at <http://medicine.wright.edu/citar/sardi/deaf-off-drugs-and-alcohol>), which features AA and NA recovery meetings in ASL, is open to deaf individuals residing anywhere in the nation.

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