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House calls revisited: leveraging technology to overcome obstacles to veteran psychiatric care and improve treatment outcomes

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Despite an increasing number of military service members in need of mental health treatment following deployment to Iraq and Afghanistan, numerous psychological and practical barriers limit access to care. Perceived stigma about admitting psychological difficulties as well as frequent long distances to treatment facilities reduce many veterans' willingness and ability to receive care. Telemedicine and virtual human technologies offer a unique potential to expand services to those in greatest need. Telemedicine-based treatment has been used to address multiple psychiatric disorders, including posttraumatic stress disorder, depression, and substance use, as well as to provide suicide risk assessment and intervention. Clinician education and training has also been enhanced and expanded through the use of distance technologies, with trainees practicing clinical skills with virtual patients and supervisors connecting with clinicians via videoconferencing. The use of these innovative and creative vehicles offers a significant and as yet unfulfilled promise to expand delivery of high-quality psychological therapies, regardless of clinician and patient location.

Keywords: telemedicine; virtual reality; videoconferencing; OIF/OEF veterans; barriers to care

Introduction

In this age of Facebook, MySpace, YouTube, and Twitter, computers are accessed and used at increasingly frequent rates. Technological advances have opened new vistas of possibility. Special issues of psychology and psychiatry journals have been devoted to the incorporation of technology into clinical practice, cautioning that in an ever-changing world, the field can not stand still.¹ Virtual reality (VR), telemedicine, and virtual humans (VHs) may offer the opportunity to address the many barriers to mental health treatment for U.S. service personnel. As strides are made to enhance current clinical practice, new hope may be offered to those with combat-related psychiatric problems.

Barriers to care

Despite high rates of reported distress, soldiers struggling with psychological problems demon-

strate a reluctance to seek care. One large-scale study examining mental health engagement in 2,530 Marines and Army personnel found that only 23–40% of soldiers who screened positive for a mental disorder following deployment to Iraq or Afghanistan sought mental health care.² Those who screened positive for mental disorders were also much more likely to endorse fears of stigma and other barriers to care.

Barriers to care can be both practical and emotional. Studies point to distance from Veterans Affairs (VA) facilities and lower priority status after returning from combat as likely deterrents to treatment for returning soldiers.³ In addition, some younger soldiers have reported discomfort with VA hospitals and a tendency to associate those facilities with treatment of older and chronically ill patients.⁴ Skepticism and cynicism about the potential benefits of treatment and side effects of medications are common among service members,⁴ adding another barrier to care.

Perceived stigma about admitting psychological difficulties also inhibits treatment seeking in U.S. service members needing mental health care. Soldiers who anticipate a negative societal reaction to revelations of emotional distress may be reluctant to disclose these problems, even to a mental health professional. Similarly, individuals who view themselves as responsible for their disorders or perceive their distress as an indication of weakness may also be reluctant to seek care.⁵

Military culture has been implicated in reinforcing the idea that soldiers should persist in spite of ailments or injuries, which may fuel soldiers' hesitance to admit psychological difficulties to peers or, at times, even to themselves.⁶ This ethos of pride in inner strength appears to persist across ranks. One study examined U.S. Armed Forces commanders' attitudes toward stress-related problems and found that although commanders accepted the existence of mental health issues, they were reluctant to disclose their own stress-related problems or seek help out of concern for negative professional or personal consequences, such as fears that they might be considered weak or be overlooked for promotions.⁷ These concerns mirror those reported by soldiers across ranks who also report fears of negative perceptions by leaders and fellow unit members, fears of being considered weak,^{8,9} concerns that seeking mental health treatment will harm their careers,⁹ and fears of stigma in general¹⁰ as key deterrents to seeking care.

Research also indicates that it may be soldiers most in need of treatment who fear reprisals the most. In a study of Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) veterans, those who meet screening criteria for a psychiatric disorder were more likely than those who did not to endorse fears of increased stigma and other barriers to care.¹¹ This study additionally found that lower sense of unit support and negative beliefs about the usefulness of psychotherapy were also associated with lowered rates of seeking psychological treatment and medication services.

Telemedicine

Videoconferencing offers one avenue to address the challenges of perceived stigma and limited accessibility. Soldiers can seek care from the safety and comfort of their homes or communities, with a sense of increased confidentiality and privacy than

they might experience having to seek care in person. In addition, because state-of-the-art psychological treatments are often unavailable to those living in rural areas, where there may be a lack of access to specialized care, the use of telemedicine can allow soldiers to seek care regardless of the remoteness of their geographic location. Given the multiple barriers to care and significant stigma associated with seeking treatment, psychotherapy utilizing a videoconferencing format offers a promising and novel option to increase access to, and potentially acceptability of, care. This paper will discuss videoconferencing-based interventions for posttraumatic stress disorder (PTSD) as well as for other clinical areas relevant to veteran populations.

Posttraumatic stress disorder

Treatment efficacy research in PTSD has proliferated in the past decade, with numerous treatment approaches proposed, implemented, and analyzed. Exposure-based treatments, including prolonged exposure, cognitive processing therapy, and eye movement desensitization and reprocessing, have yielded especially promising results and are considered the first line of treatment for PTSD.^{12,13} Yet, despite significant advances, treatment failures persist.¹⁴ More compelling, treatment is not being accessed by those with symptoms of PTSD, a problem especially prominent in the veteran population.² Even when it is sought out, providers are often hesitant to employ exposure-based therapies.^{15,16}

Preliminary research has been conducted in investigating the treatment of individuals with PTSD using videoconferencing modalities. Although only a few studies have investigated the feasibility and efficacy of conducting individual therapy with veterans with PTSD using telemedicine, this area is growing quickly. Tuerk *et al.* demonstrated the acceptability, feasibility, and safety of providing prolonged exposure therapy via videoconferencing in a pilot study of 12 veterans diagnosed with combat-related PTSD.¹⁷ The authors encountered few technical problems throughout the treatment and patients demonstrated a large reduction in PTSD symptoms across a 10-session treatment. There were no emergencies requiring on-site staff to be contacted to ensure patient safety, and treatment completion rate was 75%, which was slightly lower than the completion rate of a comparison sample of veterans treated face-to-face (83%). In another study,

Shore and Manson describe their group's successful use of telepsychiatry to treat PTSD in Northern Plains American Indian Veterans in 50 clinic sessions over the course of 7 months, including individual, group, and medication management visits.¹⁸

Germain *et al.*¹⁹ investigated treatment efficacy in 32 individuals with mixed traumas receiving cognitive behavioral therapy (CBT) in-person and 16 receiving treatment via videoconferencing. They found no differences in treatment effectiveness and significant symptom improvement in both groups after 16–25 weeks of treatment, providing preliminary support for the use of videoconferencing in PTSD treatment.

Investigators have also begun to investigate the feasibility and effectiveness of remote group treatments for combat veterans suffering from PTSD. Several studies demonstrate that videoconferenced group interventions are comparable to in-person group formats and are feasible to conduct.^{20–23} A study of CBT treatment for combat-related PTSD randomized 17 patients into videoconferencing groups and 21 into in-person group treatment.²² Each group received 14 weeks of social skills training and activities to increase social participation. No group differences were found on clinical outcomes at the end of treatment or at 3 months after treatment. Treatment satisfaction, dropout, and attendance did not differ between the two groups, although the in-person patients demonstrated better treatment adherence (e.g., higher rates of homework completion). Another randomized trial examining a 12-session manualized group therapy for treatment of anger symptoms for combat veterans with PTSD found that patients in the in-person ($n = 64$) and videoconferencing ($n = 61$) group treatments had equally significant reductions in anger symptoms, regardless of treatment modality.²³ Patients also demonstrated similar rates of attrition, adherence (e.g., homework completion), satisfaction with services, and treatment expectancy, although patients in the in-person modality reported higher levels of group therapy alliance.

Depression

A more extensive literature exists on assessment and treatment of depression. Studies have generally found videoconference-based assessment of depression to be acceptable and beneficial to patients. A randomized controlled equivalence trial of 495 pa-

tients with a range of diagnoses (296 diagnosed with depression) assigned patients to a videoconferencing or face-to-face psychiatric consultation and up to four monthly follow-up appointments.²⁴ Both groups showed equivalent clinical outcomes and levels of satisfaction. Another study explored the use of telemedicine-based interviews and assessments to diagnose and follow 45 primary care patients with symptoms of depression, panic, or generalized anxiety disorder.²⁵ Although study conclusions were limited due to the lack of a control group, patients demonstrated clinical improvement across diagnoses and reported satisfaction with the intervention. A study of the use of videoconference-based intake interviews of depressed veterans ($n = 31$) reported a high degree of satisfaction with the telemedicine modality and a willingness to recommend this method of treatment to others.²⁶

Treatment of depression has also been widely investigated. A small study of veterans with cancer ($n = 25$) investigated telemedicine-based CBT treatment for anxiety and depression,²⁷ finding evidence for the acceptability and practicality of receiving services remotely. Ruskin *et al.* conducted a randomized controlled trial of 119 depressed veterans assigned to in-person or videoconference treatment.²⁸ The authors found no differences between groups in patients' depression levels, session attendance, or medication compliance. Dropout rates were also comparable between the two groups. Fortney *et al.* published a larger-scale randomized controlled trial of 395 veterans with depression assigned to either usual care or a stepped intervention with access to various off-site providers, including a depression nurse manager, pharmacologists, and a psychiatrist.²⁹ Intervention patients demonstrated greater adherence to treatment and medications at 6–12 months and larger gains in mental health status and health-related quality of life. One systematic review has been conducted on the use of videoconferencing and Internet-augmented interventions for depression.³⁰ This review identified 10 randomized controlled trials. Four of the nine studies that examined symptom reduction demonstrated greater improvements in patients receiving care via telemedicine, with the remaining five studies showing no significant differences between the study conditions. Only four studies examined treatment adherence, and of these, no significant differences were found between the telemedicine and control groups. All five studies

that examined patient satisfaction reported equal satisfaction between the two conditions. Owing to limitations in the quality of studies, including issues with follow-up, definitions of control groups, and heterogeneity of patient populations and treatment interventions, the authors concluded that at this time, there is insufficient evidence to demonstrate the efficacy of telemedicine-based treatment for depression.

Suicide prevention

Recent epidemiological research has documented that veterans are twice as likely to die by suicide compared with nonveterans,³¹ heightening interest in the use of telemedicine to increase access to suicide risk assessments. Researchers have begun to address the legal issues, licensing requirements, and best practices for remote suicide risk assessment.^{32,33} The use of telemedicine to assess suicidal individuals has been documented in the literature.³⁴ In the single existing investigation, 71 patients living in Northern Canada were referred for suicide risk assessment with a psychiatrist, nurse, or mental health counselor via videoconference. Although no comparison group was included, patients and providers reported satisfaction with services, and the study demonstrated success in terms of cost-effectiveness.

Substance abuse

Substance abuse and dependence frequently co-occur in veterans and service members suffering from PTSD. Very few studies have examined the application of telemedicine to treat these disorders, but existing studies are encouraging. One study of intensified treatment for 37 patients on methadone maintenance who tested positive for an illicit substance found that patients randomized to counseling delivered via videoconferencing responded equally well to those receiving in-office group treatment, with 70% of videoconferencing patients achieving a minimum of 2 weeks of abstinence versus 71% of patients in the in-person treatment.³⁵ Treatment satisfaction was high and comparable across both groups. One case report also described the feasibility and effectiveness of exposure therapy delivered via videoconferencing to treat pathological gambling.³⁶

Child and family therapy

The application of telemedicine may also be considered in the treatment of children of service

members. Case studies, service descriptions, and nonrandomized trials of videoconferencing with children demonstrate feasibility in numerous areas including psychiatric consultation and management services,³⁷ diagnostic assessment,³⁸ behavioral assessment,³⁹ treatment of incarcerated youth,⁴⁰ American–Indian youth,⁴¹ treatments for sleep difficulties,⁴² and treatment of children with tics.⁴³ One randomized trial compared a manualized CBT intervention for children with depression delivered face-to-face to the same protocol delivered via tele-video. Results showed similar rates of satisfaction and dropout between the two groups, demonstrating acceptability in the population.⁴⁴ Outcomes were also comparable, with 13 of 14 patients in the televideo group and 10 of 14 patients in the face-to-face group no longer meeting criteria for major depression at the end of the eight-session protocol.

A limited number of investigations have also demonstrated the feasibility of conducting family-based interventions using telemedicine. A study examining a family intervention for epileptic rural teenagers with social difficulties found no differences in outcomes between videoconferencing, telephone, and face-to-face groups.⁴⁵ Family interventions have also been conducted via videoconferencing for children and adolescents with traumatic brain injury.^{46–48}

Caretaker interventions

Preliminary studies have evaluated a number of delivery mechanisms for the treatment and support of caregivers of individuals with a variety of diagnoses. Steffen compared the use of a video and telephone intervention ($n = 12$) to a face-to-face intervention ($n = 9$) and waitlist control ($n = 12$) for caregivers of patients with dementia.⁴⁹ Individuals in both treatment groups reported equally significant improvement in depressive affect, hostility, and confidence in their abilities to cope with the challenges of caregiving. Feasibility of a web-based videoconferencing training for caregivers of patients with mild-to-severe traumatic brain injury ($n = 15$) has also been demonstrated, with participants rating overall satisfaction and comfort with the videoconference-based training.⁵⁰ A small study also has explored the feasibility of offering a videoconferencing-based group program, consisting of psychoeducation and exercise self-management for patients and their caregivers.⁵¹ In this study, five participants and their

caregivers connected from two locations via video-conference and were compared to seven participants and their families who met in a live group format. Although attendance rates were slightly lower for the videoconference group as compared to the in-person group (70.4% versus 89.8%, respectively), all patients reported increased social support, improved ability to cope, and decreased loneliness.

Videoconferencing treatment and psychoeducational programs have also been piloted with support persons of individuals with schizophrenia⁵² and parents of children with traumatic brain injury.⁵³ A home telehealth program was utilized to assess the needs of veterans who had a stroke and of their caregivers.⁵⁴ One randomized trial addressed needs of caregivers of spinal cord injury patients either through a monthly problem-solving intervention delivered via videoconferencing or via an education-only control group.⁵⁵ Despite high dropout rates, intent-to-treat analyses showed evidence for the efficacy of the problem-solving intervention delivered via videoconference on both the reduction of symptoms of depression and an increase in social activities.

Potential challenges in the use of telemedicine

Although telemedicine-delivered treatments have been used across multiple populations and disorders, the total number of studies thus far is relatively small. Despite the potential promise of telemedicine, many mental health professionals remain reluctant to use it as a tool for treatment. In a study of psychologists' attitudes toward using videoconferencing technology, psychologists reported the belief that therapy conducted via videoconferencing would be less effective than face-to-face therapy.⁵⁶ One study attempted to examine psychologists' perceptions of therapeutic alliance in psychotherapy conducted face-to-face versus via videoconferencing and found that in scripted, identical psychotherapy sessions (conducted by a psychologist with an actor), psychologists rated therapeutic alliance as higher in the face-to-face sessions as compared to videoconferenced sessions.⁵⁷ The authors concluded that psychologists tended to have negative beliefs regarding the use of videoconferencing for psychotherapy.

Psychologists also expressed concerns that crisis situations or complex patient presentations (e.g., suicidality, personality disorders, or psychosis)

would be less manageable using telemedicine than in a face-to-face situation. Others have pointed out that in reality, as long as basic safety parameters are in place (e.g., an emergency plan), treatment delivered via telemedicine is not substantially different than in-room-delivered treatment. The therapist is present with a patient only for 1% of the time, whereas the patient is away from the therapist for the remaining 99% of the time, making risk substantially similar. In fact, patients are managed from a distance all but the single hour per week they appear in a psychologist's office.

Therapist adherence with telemedicine applications

Therapist adherence in providing CBT for PTSD either in-room or using videoconferencing technologies has also been examined.⁵⁸ Domains of therapist competence and adherence were found to be equal between videoconferencing and face-to-face group CBT sessions with combat veterans, including therapists' ability to structure sessions, implement session activities, provide feedback, deal with difficulties, develop rapport, and convey empathy.

Barriers to telemedicine training and implementation

One barrier to effective care is the paucity of specialists available to treat patients with PTSD. This appreciable shortage has led some researchers to issue a call to action⁵⁹ to draw attention to this nationwide problem and propose solutions to increasing availability of high-quality trauma training. Limited availability of trained clinicians in many parts of the country has been cited as a significant obstacle to OIF/OEF veterans and their families receiving needed care.⁶⁰

A survey of 217 licensed psychologists found that only 17% reported using exposure therapy to treat PTSD,¹⁶ despite numerous reports naming it as the first-line treatment for this disorder.^{12,13} The foremost reason cited for not using exposure was inadequate training. However, even among those who have been trained in exposure therapy, one-third (38–46%) were not utilizing it with patients, citing a reluctance to use manualized treatments and a concern that patients would decompensate during exposure, despite evidence to the contrary. Similar findings were reported among a group of psychologists trained to use prolonged exposure in the aftermath of the 9/11 attacks.¹⁵

An emphasis on training for providers is crucial. Moreover, a model has been proposed¹⁵ and implemented⁶¹ whereby the trainers provide ongoing supervision for the providers during the initial period of implementation of the techniques. Here, too, cutting-edge technology offers the means to enhance the acquisition of these goals, through enhanced training opportunities and means for more direct consultation.

Other technological applications

Virtual patients for training

The first clinical use of artificially intelligent virtual humans (VHs) dates back to 1966 when Joe Weizenbaum created a program (ELIZA) designed to emulate a Rogerian therapist. More current VH agents are designed to interact in a three-dimensional environment with real users and other VHs through face-to-face spoken dialogue and even emotional reactions. Recent technological advances have resulted in the ability to create VH agents that can engage in meaningful conversations, recognize nonverbal cues, and reason about social and emotional factors.⁶²

The potential for applications to medical and psychological education is vast. Training in patient assessment, diagnosis, treatment, and general interaction typically relies upon classroom lectures, observation, and role-playing. Virtual patients can offer a means to rehearse clinician–patient interactions. The development of one virtual reality (VR) system for psychotherapy training is described in the literature whereby a virtual patient displays a predetermined problem and type of coping style.⁶³ External cueing is needed by an outside observer to determine how the patient responds at times in the interaction, but on a limited basis. Rizzo *et al.* developed a VH named “Justin,” designed to simulate a teenage boy with conduct disorder.⁶² Justin responds to questions voiced by the user, thereby enabling clinicians to practice designing interview questions to identify the diagnosis of the patient. They next created a female sexual assault victim named “Justina,” a VH designed to train the interviewer in gleaning diagnostic information related to sensitive topics. In the initial trial, Justina was provided with 116 responses, which could serve as answers to 459 questions. The computer recognizes key words in the users’ questions and the character responds accordingly. Her responses are accompa-

nied by nonverbal cues, such as discomfort, indicated by a lowered head or halting response. This can teach new doctors to recognize the sensitivity of the material elicited when a patient who has been sexually assaulted is asked to recount her trauma, and to be conscious of the phrasing and tone of their questions. The initial trial also focused on how well users elicited answers regarding the major clusters of PTSD symptoms, teaching trainees to focus on diagnostic symptoms as described in the Diagnostic and Statistical Manual of Mental Disorders.⁶²

Ongoing projects continue to expand the applications of VHs for the use of training in psychology. VHs with suicidal ideation are being designed to train users in identifying individuals at risk for suicidality. Military versions of these VHs are being created to address the growing problem of sexual assault in the military. Treatment applications are also in development whereby military patients are seen within environments designed for the administration of imaginal exposure or VR-enhanced exposure. The clinician is able to practice the skills necessary to help the patient engage in the exposure and to simultaneously utilize the VR setup. This enables the clinician to become accustomed to the basic principles of exposure and their implementation, and to practice the juggling of the clinical and technological pieces necessary for VR exposure, before utilizing the technique with patients.⁶² This may address the hesitancy of some newly trained clinicians who cite unfamiliarity with the techniques and the technology as barriers to employing these evidence-based treatments.

Feedback and supervision

Technological advances can also facilitate the ability for newly trained clinicians to get feedback and supervision from experienced specialists in the field. BI Capture is one such program that allows the clinician to record an event in the session with just a click of a remote. Digital buffering allows the visual and auditory recording of 15 min prior to the time the system is activated. Clinicians can annotate events that are recorded on their computers and then send them to specialists for feedback. This tool is ideal for a newly trained clinician conducting an imaginal exposure exercise who finds the patient suddenly distraught. Activating the system allows the recording of the events leading up to the distress and going

forward. The clinician may add specific notes to the tape and send it to an expert in exposure who can offer direct feedback on the implementation of the technique. This technology may facilitate the process of supervision and feedback for training clinicians, and may promote the use of exposure-based therapies.

Discussion

Technological innovations in psychiatry, such as telemedicine, VR, and VHs, have enormous potential as tools to address logistical, as well as psychological, barriers to psychiatric care, from the treatment of patients to the education of providers. Given the multitude of barriers to care and the pervasive stigma associated with a psychiatric diagnosis, utilizing videoconferencing offers a promising and novel option to improve access to and acceptability of care, whereas VHs offer a powerful tool both for the education of the provider as well as the treatment of patients.

However, there are numerous challenges to confront before use of telemedicine and VR technology become widespread by mental health providers. These challenges include (1) resistance to change, (2) licensing and jurisdiction issues, and (3) reimbursement by insurance plans. Perhaps the most formidable challenge is overcoming the psychological barriers to the use of VR and distance technology among providers. Advances in the use of telemedicine equipment as a tool to deliver treatment has met with resistance by providers. Several studies cited above note the reluctance to using evidence-based treatments and telemedicine based on myths and fear—not on any hard evidence pointing to their detrimental nature. Additionally, licensing of health care providers currently is a state-based function. Education of our state and federal legislators about the use of telemedicine by our professional guilds is a crucial next step in solving jurisdictional issues, so that the needs of patients in remote areas can be met. Finally, ensuring that services provided via telemedicine are reimbursed by all insurance plans is crucial; it will likely require legislative intervention as well.

The legal and policy issues concerning licensing jurisdiction and reimbursement are certainly significant, but solvable, issues. The most daunting challenge to creating the momentum for change will be

in motivating providers to examine their prejudices regarding the use of technology in psychiatric care.

Conflicts of interest

The authors declare no conflicts of interest.

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