Study Title:
Behavioral Intervention to Improve Sleep Apnea Treatment Adherence in Veterans with Traumatic Brain Injury: A Feasibility Study

Short Title:
Intervention to Improve Sleep Apnea Treatment Adherence

USF eIRB Protocol Number:
Pro00041471

Principal Investigator:
Marc A. Silva, PhD

Study Site:
James A. Haley Veterans' Hospital, Tampa, FL

Sponsor:
Not funded

1. Rationale for the study, area of current scientific concern and why the research is needed.

Sleep Apnea is among the leading sleep disorders in Veterans seeking VA healthcare[32] increasing their risk for myriad adverse outcomes including poor physical health,[5-6,13-14] impaired cognition, higher risk for dementia,[10-12,18] and declining mental health (i.e., worsening posttraumatic stress disorder symptoms,[33] suicidal ideation,[34] and lack of treatment responsiveness).[34] Sleep Apnea is a treatable health condition that commonly co-occurs with Traumatic Brain Injury (TBI), which is a leading cause of long-term disability,[36] affecting over 1.7 million individuals annually in the United States,[37] and over 380,000 members of the armed forces since the year 2000.[38] To date, interventions to improve guideline-endorsed frontline Positive Airway Pressure (PAP) treatment[17] for persons with comorbid Sleep Apnea and moderate-to-severe TBI have not been developed despite high PAP nonadherence rates. [21,30]

This study will develop, test, and refine a clinical intervention designed to enhance PAP adherence with cognitive accommodations for persons with moderate-to-severe TBI.[39] Should this intervention prove feasible, results will inform a future trial to determine its efficacy, with subsequent research to include studies on effectiveness, wide-scale adoption, and implementation within the VA. The clinical intervention results will be translatable to other populations with similar neurologic burden (i.e., stroke, anoxia, mild cognitive impairment) and can be adopted by other healthcare systems in the private sector and Department of Defense (DoD). Stakeholder Input: Improving PAP adherence in at-risk populations (e.g., TBI) are high priority research needs identified by national stakeholder-led initiatives led by the Agency for Healthcare Research and Quality (Future Research Needs Project)[40] and joint collaboration between the National Institute of Health and Sleep Research Society.[41] Further, input by clinicians and Veterans (Tampa Veterans Engagement Council)[42] was used in refinement of topic selection, study methodology, and refinement of the manualized intervention to maximize the research translation success.

2. Background information, description of existing research and information that is already known.

Sleep Problems Are Prevalent in TBI Rehabilitation Settings. In the largest study examining sleep disturbance in acute rehabilitation for moderate-to-severe TBI, we reported 84% of 205 consecutive admissions had sleep disruption of varying severity.[27] During a time of critical neural repair, 63% of the sample remained sleep disturbed, 33% with moderate to severe sleep disturbance (i.e., several nighttime awakenings), near the time of rehabilitation discharge.[27]

Sleep Affects Outcomes After Controlling for TBI Injury Severity. After controlling for known predictors of TBI outcomes (age, time elapsed since injury, and initial Glasgow Coma Scale score), we reported that the presence of persistent moderate or severe sleep disturbance predicted longer rehabilitation length of stay, prolonged posttraumatic amnesia (PTA), and lack of improvement on serial cognitive testing.[28] The impact of acute sleep-wake cycle disturbance was highlighted by Dr. Silva's work demonstrating that individuals with greater daytime hypersomnolence cooperated less with rehabilitation therapies.[20] These studies demonstrate that post-TBI sleep problems are associated with negative outcomes (i.e., prolonged impaired cognition, decreased benefit from rehabilitation therapy, and higher cost of care).

Incidence of Sleep Apnea in TBI. Our group published a study with the largest consecutive series of patients admitted for TBI rehabilitation who underwent diagnostic polysomnography during inpatient rehabilitation to diagnose presence and severity of sleep apnea.[2] Thirty-seven percent were diagnosed with sleep apnea, a significantly higher incidence relative to the general population,[29] and higher than estimates by recent meta-analytic review in TBI (25%).[1]

Sleep Apnea Treatment Adherence is Poor in Veterans with TBI. Dr. Silva was the first to report on guideline endorsed frontline therapy (PAP)[17] among Veterans and Military Service Members hospitalized after moderate or severe TBI and diagnosed with Sleep Apnea. In this study, 68% did not adhere to PAP treatment during a time of critical neural repair.[30] Examination of downloadable smart cards revealed that PAP was used 29% of the nights monitored with a median duration of one hour per night.[30] This level of PAP usage is far below the recommended adherence guideline of ≥ 4 hours per night on at least 70% of nights.[5] Compared to the general population, the rate of nonadherence observed was substantially higher in our TBI cohort.[21]

Adherence to PAP is essential to reap the therapeutic benefit of the treatment.[22] To date, no studies have examined maximizing frontline PAP treatment for persons with TBI. Therefore, the objective of this study is to develop and test the feasibility of a manualized intervention to maximize PAP success in Veterans with Sleep Apnea and TBI to improve neurologic recovery and maximize long-term outcomes. Existing interventions to improve PAP adherence have not been adapted for persons with TBI. Psychoeducation is part of the standard of care for the treatment of Sleep Apnea[17] but on its own has been shown to be ineffective in improving PAP adherence.[22-23] Alternatives include Motivational Interviewing (MI) and Cognitive Behavioral Therapy (CBT). Unfortunately, these evidence-based interventions have not yet been adapted to address PAP adherence in persons with TBI, who often require cognitive accommodations.[39] Hence, it remains unknown whether these evidence-based interventions (designed for cognitively healthy individuals) are feasible for, and have the ability to improve adherence in, persons with moderate-to-severe TBI.

3. The research questions, objectives, and purpose.

This is a 2-year mixed methods[43] study using quantitative and qualitative inquiry to determine the feasibility and acceptability of a novel 4-session PAP adherence intervention based on evidence-based MI and CBT, with cognitive accommodations for TBI (Aim 1). Feasibility is the ease to which the intervention can be delivered (e.g., eligibility rates, recruitment rates), and acceptability is the extent to which persons receiving the intervention consider it appropriate (e.g., satisfaction ratings).[44-45] Feasibility of process and outcome measures (e.g., completeness, perceived value and burden)[46] will also be examined (Aim 2). We will explore preliminary response to the intervention by examining PAP usage (Aim 3). There are no study hypotheses specified, consistent with recommendations for designing clinical research feasibility studies.[47-48,86]

4. The study design including information that is needed to answer the research questions

Prospective, within subjects, repeated measures design.

After consent, participants will complete pre-intervention questionnaires. Then, they will receive the manualized intervention. After each session, they will complete a questionnaire on their experience. After all sessions, they will complete post-intervention questionnaires, and participate in an interview about their experience of the intervention. Intervention sessions will be recorded and reviewed for fidelity. Data from questionnaires will be entered into a database for analysis. Interview data will be qualitatively analyzed.

5. Sample size

19 participants

6. Study Population inclusion and exclusion criteria

Inclusion criteria: (1) moderate-to-severe TBI consistent with consensus definition;[55] (2) diagnosed with sleep apnea; (3) prescribed PAP therapy; (4) nonadherent to PAP treatment;[5] and (5) able to consent.

7. The expected results of the research, such as reports, papers, and contributions to theory

- Refinement of the manualized intervention, to be tested in a future RCT
- Identification of appropriate outcome measures for this intervention
- Presentations at scientific meetings targeting rehabilitation and military/veteran health care audiences
- Publication of study results in a scientific, peer-reviewed journal

8. Name of the Principal Investigator and Faculty Advisor if applicable

Principal Investigator: Marc A. Silva, PhD
Faculty Advisor: Not Applicable

9. Any potential risks to the subjects

The potential risks associated with this study are minimal. The activities and procedures of this study are non-invasive, thus risk of physical harm is unlikely. It is possible that emotional discomfort may occur while participating in the brief cognitive test, or completing symptom questionnaires, or when discussing the participant's health and sleep apnea treatment. In the event of emotional discomfort, the participant may choose to discontinue the activity. Also, we can notify the participant's current health care treatment providers or refer the participant to a physician or psychologist if the participant would like us to. We do not anticipate any financial or legal risk associated with this study. It is possible that there risks that are unknown to us.

Safety precautions that will be taken to minimize risks/harms: Study staff follow VA hospital policy and complete annual trainings related to HIPAA, Privacy, and Information Security. Hard copy data (data collection forms, recordings of counseling intervention sessions) will be stored in a locked cabinets in locked offices (Bldg 38, Room C-253 and B-258). Data collection forms will not contain name, social security number, or other personal identifiers, with the exception of date of birth which is used to calculate age at various points in time (e.g., at injury, at time of sleep apnea diagnosis, at time of study participation). Recordings will be identified using a unique ID number that will be assigned to each participant for this study – it will not contain name, social security number, or other identifiers. Only members of the research team have access to research data. Electronic data (e.g., Electronic Data Set) will be stored on a secure folder on the VA server, behind the VA firewall, within R:/PROJECTS_CURRENT. The tracking form that links the participant's identity to the ID number, and will be a in its own document, separate from the Electronic Data Set, which stores data collected as part of this research study. Research records will be maintained according to VA hospital policy.

10. Any experimental procedures or interventions that will be implemented

The intervention is derived from evidence-based Motivational Interviewing (MI) and Cognitive Behavioral Therapy (CBT), which have been utilized in non-brain injured populations to improve adherence in the context of various behavioral health conditions.[17,24-26]

The intervention is designed as a 4-session treatment. Sessions are generally designed to occur over 4 separate visits lasting approximately an hour for each session. The intervention is derived from evidence-based psychological treatments drawn from MI and CBT. In addition to participating in discussion and information exchange, the participants will also be asked to track their PAP usage, report on their sleep apnea related symptoms, and share their ratings on their confidence for, barriers to, and facilitators of behavioral change.

Participants will be asked to complete symptom measures pre- and post-intervention.

Participants will be asked to participate in a post-intervention qualitative interview to provide feedback on the intervention.

11. Study visit timeline

There are approximately 6 visits which can be completed, at the participant's preference, over the course of 4-12 weeks, to permit flexibility on the part of participants. Completing questionnaires will take approximately 10-15 minutes. The intervention sessions will last approximately 30 to 60 minutes. The interview for participant feedback on intervention acceptability will last approximately 30 to 60 minutes.

12. Any potential benefits to subjects

Direct Benefits: None
Societal Benefits: By participating in this study, there is potential that study findings will lead to improvement in the management of sleep apnea in persons with brain injury.

13. Human subjects considerations:

Inpatient TBI/Polytrauma records, outpatient TBI clinic records, and sleep medicine / respiratory / pulmonary records will be reviewed prior to consent for screening purposes. Information to be gleaned will include those needed to ensure study inclusion criteria (TBI diagnosis, Sleep Apnea Diagnosis, prescribed PAP therapy, capacity to consent), as well as determine upcoming clinic appointments so the potential participant can be approached. Informed consent will be obtained from the participant by the PI or designee (e.g., Project Manager or Research Assistant). Information about study purpose, procedures, risk and benefits will be reviewed. They will be informed that study participation is voluntary and they may withdraw at any time. Those who agree will receive a copy of the informed consent document. The signed version will be stored in a locked filing cabinet in a locked office suite (Bldg 38, Room C-253 or B-258).

Cognitive impairment is a common consequence of moderate-to-severe TBI. Participants are given the option to confer with trusted others (e.g., family members, their doctor) prior to and during study participation. Appointment reminders are a necessary cognitive accommodation for persons with brain injury. We will contact them via telephone and/or send reminder appointment letters to the phone and/or address of the participant and/or alternative contacted designated by the participant. Although not specifically targeted, active duty service members who are being treated for TBI at the James A Haley VA Hospital (as part of a Memorandum of Understanding for specialty care between VA and DoD) will be recruited, as they are established patients at the James A Haley VA Hospital at the time of study participation.

Participants will be assigned a unique identifier. Participant-specific electronic documents will be named using the participant's ID number, and stored on a VA server behind the VA firewall. Hard copy data will also be labeled using the participant's ID number, and stored in locked cabinets in a locked offices (Bldg 38, Room C-253 or B-258).

14. Data and safety monitoring plan.

Not applicable, as this is a minimal risk study.