AWARD NUMBER: W81XWH-17-1-0649

TITLE: Post-Traumatic Psychogenic Seizure and Epilepsy Project

PRINCIPAL INVESTIGATOR: Hamada Hamid Altalib

CONTRACTING ORGANIZATION: VA Connecticut Research and Education
West Haven, CT 06516

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1. REPORT DATE October 2018	**2. REPORT TYPE** Annual report	**3. DATES COVERED** 30 Sep 2017 - 29 Sep 2018
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6. AUTHOR(S) Hamada Altalib, Daniela Galluzzo, Stephanie Argraves, Ebony Jackson Shaheed Joseph Goulet, Arjumond Khan, Cynthia Brandt, Mary Jo Pugh E-Mail:		**5d. PROJECT NUMBER** **5e. TASK NUMBER** **5f. WORK UNIT NUMBER**
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) VA Connecticut Research and Education 950 Campbell Avenue West Haven, CT 06516-2770		**8. PERFORMING ORGANIZATION REPORT NUMBER**
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14. ABSTRACT

Over 80,000 veterans who utilize the VA healthcare system are diagnosed with epilepsy, and preliminary data suggest a substantial proportion actually suffer from Psychogenic Non-Epileptic Seizures (PNES) instead, a psychiatric disorder. In the DSM-V, PNES is classified as a conversion disorder, a type of somatic symptom disorder diagnosed as such after appropriate medical assessment finds the presenting neurological symptoms incompatible with neurological pathophysiology. In this case, individuals with PNES display seizure-like events without a vEEG correlate and can exhibit characteristic semiology distinct from epileptic seizures. Known risk factors for developing PNES in the general population include mental, physical, and social distress. Among veterans, a history of post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) are associated with PNES; however, the complex relationship between these three disorders is not well understood.

The main objective of this study is to establish the role of PTSD, TBI, and other co-morbidities (chronic pain, military sexual trauma, female gender) in the causal pathway of PNES among post-9/11 veterans. Secondary objectives are to study the relationship between the treatment (psychotropic and psychotherapeutic) of PTSD, mood, and other anxiety disorders and the risk of developing PNES, the severity of the disorder (number of monthly psychogenic seizures), and likelihood of recovery (seizure-free for six months).

This is a longitudinal retrospective cohort study of veterans who utilized the VA healthcare system for at least two years during the period of 2002-2015. We have grouped them into those who meet criteria for epilepsy (n = 6811), PNES (n = 327; as defined by the International League Against Epilepsy), and a comparison group (n = 1.2 million) who have no documented epilepsy or PNES history. The cohort was constructed from existing VA electronic and administrative sources utilizing validated algorithms to identify Veterans with epilepsy as well as co-morbid medical and psychiatric disorders. The data will be uploaded into a VA SQL Server database for secure storage, query and manipulation of subject data. Patient data has been de-identified to protect confidentiality.

During primary analysis, Generalized Estimating Equations (GEE) will be used to determine if the rate of change in newly diagnosed PNES increases over time and specifically, if TBI identified in DoD/VA is significantly associated with that change. During secondary analysis, we will estimate the number of newly diagnosed Veterans and prevalence rates of PNES using Poisson regression. Other statistical analysis methods include two logistic regressions; and time-to-event models to examine how pharmacologic treatments for PTSD (or comorbid depression or anxiety) are negatively associated with PNES development.

We hope the results of this study influence clinical management of veterans with PNES, that by clearly identifying comprehensive risk factors, elucidating a causal pathway, and evaluating the timing and type of mental health treatment may improve the health of this vulnerable population as well as decrease healthcare costs.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			USAMRMC
Unclassified	Unclassified	Unclassified	Unclassified		**19b. TELEPHONE NUMBER** *(include area code)*

TABLE OF CONTENTS

1. **INTRODUCTION:** *Narrative that briefly (one paragraph) describes the subject, purpose and scope of the research.*

PNES is a dissociative disorder that is a major burden on veterans.Over 80,000 veterans who utilize the VA healthcare system currently carry the diagnosis of epilepsy, and preliminary data suggest a substantial proportion of those may have PNES instead. Similar to focal seizures with change of consciousness or generalized tonic-clonic seizures, people who suffer from PNES and other dissociative disorders lose partial or complete integration of perception and are disconnected from their environment during the events. According to the VA's Epilepsy Centers of Excellence (ECOE) 2012 Annual Report, PNES accounted for 29% of all inpatient epilepsy monitoring unit (EMU) evaluations within the national ECOE network, nearly identical to rates reported in civilian populations. Estimated direct health costs saved per patient identified per year is $13,750, which extrapolates to 2.6 million dollars in cost savings per year to the VA system from corrected diagnoses. Veterans with PNES may suffer worse outcomes than civilians with PNES. For instance, the delay in the diagnoses of PNES from their first seizure is five years in Veterans compared to only one year in civilians, which may impact their employment, social function, and ability to drive and access resources. Furthermore, veterans with PNES are treated with anti-epileptic drugs (AED) four times more often than civilians with PNES, exposing them to the risk of side effects and costs of unnecessary medications.

2. **KEYWORDS:** *Provide a brief list of keywords (limit to 20 words).*

Psychogenic non-epileptic seizures, Traumatic brain injury, Post Traumatic Stress Disorder, video EEG, conversion disorders, Anti-seizure drug, epilepsy monitoring unit

3. **ACCOMPLISHMENTS:** *The PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction.*

What were the major goals of the project?
List the major goals of the project as stated in the approved SOW. If the application listed milestones/target dates for important activities or phases of the project, identify these dates and show actual completion dates or the percentage of completion.

Specific Aim 1: **Describe the change in prevalence of newly diagnosed Veterans with post-traumatic and non-traumatic Psychogenic Non-Epileptic Seizures (PNES) in the VA Post 9/11 population over time**
Specific Aim 2: **Describe the risk factors (Female gender, PTSD, Depression, Anxiety, Military Sexual Trauma, Chronic Pain, TBI) for PNES including PNES subsequent to TBI (PTPNES)**
Specific Aim 3: **Explore whether prior psychotropic and psychotherapeutic treatments for mood and anxiety disorders decrease the risk of developing PNES.**
Specific Aim 3a (Exploratory): **Explore whether prior psychotropic and psychotherapeutic treatments for mood and anxiety disorders decrease the severity of PNES (number of monthly psychogenic seizures) and increase the likelihood of recovery (seizure-free for six months).**

What was accomplished under these goals?

For this reporting period describe: 1) major activities; 2) specific objectives; 3) significant results or key outcomes, including major findings, developments, or conclusions (both positive and negative); and/or 4) other achievements. Include a discussion of stated goals not met. Description shall include pertinent data and graphs in sufficient detail to explain any significant results achieved. A succinct description of the methodology used shall be provided. As the project progresses to completion, the emphasis in reporting in this section should shift from reporting

Major Task 1: Complete Regulatory Requirements for Study	Months	Complete
Coordinate with Sites for MOU/ DTA completion, nondisclosure agreements	1-2	x
Finalize protocol chart abstraction tool	PTF	x
Secondary site IRB protocol submission (expedited)	1-4	
Coordinate with Sites for Military 2nd level IRB review (ORP/HRPO)	1-6	x
Submit amendments, adverse events and protocol deviations as needed	1-36	x
Coordinate with Sites for annual IRB report for continuing review	Annually	x
Milestone Achieved: Local IRB and HRPO approval at VACT, SLC VA	3-6	pending
Major Task 2: Identify cohort who meet criteria for epilepsy and PNES		
Complete data request documentation for VA and DoD data sources	PTF	x
Obtain VA and DOD data, identify TBI severity, comorbidity, and other clinical characteristics	6-12	Pending
Milestone Achieved: Raw Data obtained	12	X
Subtask 2:Identify epilepsy in FY02-FY15 cohort	13	X
Compile data from VA and DoD data sources and identify epilepsy and PNES characteristics	13	
Milestone Achieved: Cohort of Veterans of Epilepsy identified	13	
Conduct/interpretation of logistic regression analyses on Post-9/11 VA cohort and complete manuscripts	14-18	
Milestone Achieved: Aims 1 and 2 completed	18	
Major Task 3: Identify Sample for Aim 3		
*Identify sampling frame for people at risk for PNES (for chart abstraction)	19	
Major Task 3: Identify Sample for Aim 3	20-26	
*Identify sampling frame for people at risk for PNES (for chart abstraction)	19	
Conduct medical chart abstraction for PNES validation and identify sampling frame to identify PNES and confirmed epilepsy cases from epilepsy cohort		
Milestone Achieved: Study sample frame for Aim 3 identified	27	

Major Task 4: Conduct analysis for Aim 3	32-36	
Conduct interim and final analyses/ interpretation for Aims 3	28-32	
Complete manuscripts for publication	32-36	
Milestone Achieved: Report findings of the impact of mental health treatment on the incidence and severity of PNES (Aim 3)	36	

We have reviewed 700 of our first 928 Veterans with PNES from the Women Veteran Cohort Study (WVCS) (N=985,750). Cumulative prevalence of PNES per 1000 Post 9/11 was calculated yearly from 2004-2014.The cumulative prevalence of PNES in the VA system is increased from 0.0727 to 0.3662 per 1000 Post-9/11 Veterans (a 122.7% increase) from 2004 to 2014. These preliminary results were presented at the American Academy of Neurology 2018 annual meeting as a poster presentation.

Preliminary results have been submitted to the American Academy of Neurology for a poster presentation at the 2019 annual meeting regarding the use of standard psychotherapy in the prevention of PNES as well as a separate abstract on the preliminary results of the risk factors of PNES vs. ES.

We will continue to gather data on the Veterans identified with likely PNES. A major component of our research is to link Department of Defense (DoD) data sources to VA data.

Dr. Mary Jo Pugh, who is the primary investigator for the CDMRP-funded "The Epidemiology of Epilepsy and Traumatic Brain Injury: Severity, Mechanism and Outcomes" study and is in the process of securing IRB approval for her work and moving her data to Utah. Once she has transitioned her study we will be able to link our data to hers.

Mary Jo Pugh, the primary investigator who is leading the DoD collection, integration, and analysis. Our objective is to establish a data sharing agreement to link of DoD and VA data. We also intend to get access to the DoD data during the next quarter.

What opportunities for training and professional development has the project provided?

If the project was not intended to provide training and professional development opportunities or there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe opportunities for training and professional development provided to anyone who worked on the project or anyone who was involved in the activities supported by the project. "Training" activities are those in which individuals with advanced professional skills and experience assist others in attaining greater proficiency. Training activities may include, for example, courses or one-on-one work with a mentor. "Professional development" activities result in increased knowledge or skill in one's area of expertise and may include workshops, conferences, seminars, study groups, and individual study. Include participation in conferences, workshops, and seminars not listed under major activities.

Daniela Galluzzo has had the opportunity to take Coursera courses in basic research methods. Ebony Jackson Shaheed has the opportunity to receive mentorship from Stephanie Argraves, Joseph Goulet, and Hamada Hamid Altalib in statistical analyses and the use of SAS.

How were the results disseminated to communities of interest?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how the results were disseminated to communities of interest. Include any outreach activities that were undertaken to reach members of communities who are not usually aware of these project activities, for the purpose of enhancing public understanding and increasing interest in learning and careers in science, technology, and the humanities.

None to report

What do you plan to do during the next reporting period to accomplish the goals?
If this is the final report, state "Nothing to Report."

Describe briefly what you plan to do during the next reporting period to accomplish the goals and objectives.

We intend to continue gathering data on the Veterans identified with likely PNES. We intend to include Veterans with an ICD-10 diagnosis (after 2015) of PNES to expand our cohort. We also intend to get access to the DoD and link it to Veteran data. Analysis of risk factors for epilepsy and PNES groups as well as an analysis of outcomes for epilepsy and PNES groups.

4. **IMPACT:** D*escribe distinctive contributions, major accomplishments, innovations, successes, or any change in practice or behavior that has come about as a result of the project relative to:*

What was the impact on the development of the principal discipline(s) of the project?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how findings, results, techniques that were developed or extended, or other products from the project made an impact or are likely to make an impact on the base of knowledge, theory, and research in the principal disciplinary field(s) of the project. Summarize using language that an intelligent lay audience can understand (Scientific American style).

Nothing to report

What was the impact on other disciplines?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how the findings, results, or techniques that were developed or improved, or other products from the project made an impact or are likely to make an impact on other disciplines.

Nothing to report

What was the impact on technology transfer?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe ways in which the project made an impact, or is likely to make an impact, on commercial technology or public use, including:

- *transfer of results to entities in government or industry;*
- *instances where the research has led to the initiation of a start-up company; or*
- *adoption of new practices.*

Nothing to report

What was the impact on society beyond science and technology?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how results from the project made an impact, or are likely to make an impact, beyond the bounds of science, engineering, and the academic world on areas such as:

- *improving public knowledge, attitudes, skills, and abilities;*
- *changing behavior, practices, decision making, policies (including regulatory policies), or social actions; or*
- *improving social, economic, civic, or environmental conditions.*

Nothing to report

5. **CHANGES/PROBLEMS:** *The PD/PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction. If not previously reported in writing, provide the following additional information or state, "Nothing to Report," if applicable:*

Changes in approach and reasons for change
Describe any changes in approach during the reporting period and reasons for these changes. Remember that significant changes in objectives and scope require prior approval of the agency.

Nothing to report

Actual or anticipated problems or delays and actions or plans to resolve them
Describe problems or delays encountered during the reporting period and actions or plans to resolve them.

Dr. Mary Jo Pugh has moved from San Antonio to Utah. She is the primary investigator for the CDMRP-funded "The Epidemiology of Epilepsy and Traumatic Brain Injury: Severity, Mechanism and Outcomes" study and is in the process of securing IRB approval for her work and moving her data to Utah. Once she has transitioned her study we will be able to link our data to hers. The DoD subcontract for Utah has recently been approved (September 2018), once the regulatory and subcontracting issues have been resolved for Utah, we will be able to link our data to hers.

Changes that had a significant impact on expenditures
Describe changes during the reporting period that may have had a significant impact on expenditures, for example, delays in hiring staff or favorable developments that enable meeting objectives at less cost than anticipated.

Nothing to report

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents
Describe significant deviations, unexpected outcomes, or changes in approved protocols for the use or care of human subjects, vertebrate animals, biohazards, and/or select agents during the reporting period. If required, were these changes approved by the applicable institution committee (or equivalent) and reported to the agency? Also specify the applicable Institutional Review Board/Institutional Animal Care and Use Committee approval dates.

Significant changes in use or care of human subjects

Nothing to report

Significant changes in use or care of vertebrate animals

Nothing to report

Significant changes in use of biohazards and/or select agents

Nothing to report

6. **PRODUCTS:** *List any products resulting from the project during the reporting period. If there is nothing to report under a particular item, state "Nothing to Report."*

- **Publications, conference papers, and presentations**
  Report only the major publication(s) resulting from the work under this award.

  Journal publications. *List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Identify for each publication: Author(s); title; journal; volume: year; page numbers; status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).*

Nothing to report

  Books or other non-periodical, one-time publications. *Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like. Identify for each one-time publication: author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (e.g., book, thesis or dissertation); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).*

Nothing to report

  Other publications, conference papers and presentations. *Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication as noted above. List presentations made during the last year (international, national, local societies, military meetings, etc.). Use an asterisk (*) if presentation produced a manuscript.*

Khan A, Proops N, Flaherty J, Fenton B, Pugh MJ, Cheung K, Goulet J, Brandt C, Altalib H. Preliminary Report of Psychogenic Non-Epileptic Seizure Diagnosis Among Veterans From 2004–2014 (P6. 275). American Academy of Neurology 2018 Annual Meeting, Los Angeles CA

- **Website(s) or other Internet site(s)**
  List the URL for any Internet site(s) that disseminates the results of the research activities. A short description of each site should be provided. It is not necessary to include the publications already specified above in this section.

  Nothing to report

- **Technologies or techniques**
  Identify technologies or techniques that resulted from the research activities. Describe the technologies or techniques were shared.

  Nothing to report

- **Inventions, patent applications, and/or licenses**
  Identify inventions, patent applications with date, and/or licenses that have resulted from the research. Submission of this information as part of an interim research performance progress report is not a substitute for any other invention reporting required under the terms and conditions of an award.

  Nothing to report

- **Other Products**
  Identify any other reportable outcomes that were developed under this project. Reportable outcomes are defined as a research result that is or relates to a product, scientific advance, or research tool that makes a meaningful contribution toward the understanding, prevention, diagnosis, prognosis, treatment and /or rehabilitation of a disease, injury or condition, or to improve the quality of life. Examples include:
  - *data or databases;*
  - *physical collections;*
  - *audio or video products;*
  - *software;*
  - *models;*
  - *educational aids or curricula;*
  - *instruments or equipment;*
  - *research material (e.g., Germplasm; cell lines, DNA probes, animal models);*
  - *clinical interventions;*
  - *new business creation; and*
  - *other.*

  Nothing to report

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Provide the following information for: (1) PDs/PIs; and (2) each person who has worked at least one person month per year on the project during the reporting period, regardless of the source of compensation (a person month equals approximately 160 hours of effort). If information is unchanged from a previous submission, provide the name only and indicate "no change".

Example:

Name:	*Mary Smith*
Project Role:	*Graduate Student*
Researcher Identifier (e.g. ORCID ID):	*1234567*
Nearest person month worked:	*5*
Contribution to Project:	*Ms. Smith has performed work in the area of combined error-control and constrained coding.*
Funding Support:	*The Ford Foundation (Complete only if the funding support is provided from other than this award.)*

Name:	Dr. Hamada Hamid Altalib
Project Role:	Primary Investigator
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	4
Contribution to Project:	Led the administration, team development and meetings, daily operations, data collection, and data analysis. Submitted two abstracts
Name:	Dr. Mary Jo Pugh
Project Role:	Co-Principal Investigator
Researcher Identifier (e.g. ORCID ID):	Orcid ID: 0000-0003-4196-7763
Nearest person month worked:	*3*
Contribution to Project:	Setting up Department of Defense data source and supervising

Name: Dr. Kei-Hoi Cheung
Project Role: Informatics Research Scientists
Researcher Identifier (e.g. ORCID ID):
Nearest person month worked: *3*
Contribution to Project: Developed data extraction tool (Voogo) and is training data manager on setting up database

Name: Dr. Joseph Goulet
Project Role: Epidemiologist/Biostatistician
Researcher Identifier (e.g. ORCID ID): 0000-0002-0842-804X
Nearest person month worked: 3
Contribution to Project: *C*ollecting and validating the co-morbidity data as well as conduct the statistical analysis and interpretation, and edit manuscripts and reports.

Name: Stephanie Argraves
Project Role: Data Manager
Researcher Identifier (e.g. ORCID ID): 0000-0002-6418-4449
Nearest person month worked: 3
Contribution to Project:

Name: Dr. Daniela R. Galluzzo
Project Role: Research Assistant
Researcher Identifier (e.g. ORCID ID):
Nearest person month worked: 4
Contribution to Project: *D*ata collection and research coordinator; arrange meetings (telephone and video conference) with co-investigators and staff, prepare materials and documents, protocols, institutional board review, and data use agreements.

Name: Ebony Jackson Shaheed
Project Role: Research Assistant
Researcher Identifier (e.g. ORCID ID):
Nearest person month worked: 2
Contribution to Project: Statistical analysis and interpretation, edit manuscripts and reports

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

If the active support has changed for the PD/PI(s) or senior/key personnel, then describe what the change has been. Changes may occur, for example, if a previously active grant has closed and/or if a previously pending grant is now active. Annotate this information so it is clear what has changed from the previous submission. Submission of other support information is not necessary for pending changes or for changes in the level of effort for active support reported previously. The awarding agency may require prior written approval if a change in active other support significantly impacts the effort on the project that is the subject of the project report.

Nothing to report

What other organizations were involved as partners?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe partner organizations – academic institutions, other nonprofits, industrial or commercial firms, state or local governments, schools or school systems, or other organizations (foreign or domestic) – that were involved with the project. Partner organizations may have provided financial or in-kind support, supplied facilities or equipment, collaborated in the research, exchanged personnel, or otherwise contributed.

Provide the following information for each partnership:
Organization Name:
Location of Organization: (if foreign location list country)
Partner's contribution to the project (identify one or more)

- *Financial support;*
- *In-kind support (e.g., partner makes software, computers, equipment, etc., available to project staff);*
- *Facilities (e.g., project staff use the partner's facilities for project activities);*
- *Collaboration (e.g., partner's staff work with project staff on the project);*
- *Personnel exchanges (e.g., project staff and/or partner's staff use each other's facilities, work at each other's site); and*
- *Other.*

Name:	Dr. Mary Jo Pugh
Project Role:	Co-Principal Investigator
Organization Name):	University of Utah- School of Medicine
Location of Organization:	Salt Lake City, Utah
Contribution to Project:	Setting up Department of Defense data source and supervising

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: *For collaborative awards, independent reports are required from BOTH the Initiating Principal Investigator (PI) and the Collaborating/Partnering PI. A duplicative report is acceptable; however, tasks shall be clearly marked with the responsible PI and research site. A report shall be submitted to* ***https://ers.amedd.army.mil*** *for each unique award.*

QUAD CHARTS: *If applicable, the Quad Chart (available on https://www.usamraa.army.mil) should be updated and submitted with attachments.*

9. APPENDICES: *Attach all appendices that contain information that supplements, clarifies or supports the text. Examples include original copies of journal articles, reprints of manuscripts and abstracts, a curriculum vitae, patent applications, study questionnaires, and surveys, etc.*

Abstracts

Submitted to American Academy of Neurology 2019 Annual Meeting

How effective is standard mental health treatment for the prevention of PNES: a preliminary study?

Daniela Galluzzo, Stephanie Argraves, Ebony Jackson Shaheed, Joseph Goulet, Cynthia Brandt, Mary Jo Pugh, Hamada Altalib

Objective:

The objective of this study was to explore access of veterans to mental health therapies prior to the diagnosis of PNES.

Background:

Psychogenic nonepileptic seizures (PNES) are paroxysmal events, not caused by ictal epileptiform activity. PNES is strongly associated with post-traumatic stress disorder (PTSD). Treatment efficacy of PNES remains controversial, however it has been proposed that both psychotherapy and pharmacotherapy cause a reduction in seizure frequency and healthcare utilization.

Methods:

This is a longitudinal, retrospective study of healthcare records of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) veterans using the VA healthcare system, diagnosed with PNES through video electroencephalogram (vEEG) from 2003-2016. Chi-squared analyses were conducted between covariates.

Results:

Of the 371 veterans were included in this cohort, 308 (83%) were male, and the average age at first PNES episode was 34. In the year prior to diagnosis, 212 (57%) experienced >30 episodes, prompting at least one emergency room visit in 89 (24%), and at least one hospital admission in 91 (25%). Psychotherapy was performed in 160 (43%), of which 139 (87%) were diagnosed with PTSD. Psychotherapy was most frequently individual (136 (85%)), supportive therapy (138 (86%)), with 97 (61%) veterans undergoing <20 therapy sessions and 40 (25%) undergoing >20. Seizure burden was not associated with the utilization of psychotherapy (p=0.067), however seizure burden was associated with PTSD (0.0001). Pharmacotherapy in the form of anti-seizure drugs (ASDs) were utilized in 288 (78%), including ASDs with known mood stabilizing properties; Valproate 72 (5%), Lamotrigine 191 (66%), Carbamazepine 80 (28%), and Oxcarbazepine 43 (15%).

Conclusion:

Preliminary analysis suggests most veterans with PNES received psychotherapy for PTSD prior to diagnosis and yet continued to suffer from PNES. This may imply that although PTSD and PNES may exist concomitantly, PNES requires a separate and specific treatment modality.

Presented at American Academy of Neurology 2018 Annual Meeting

Preliminary Report of Psychogenic Non-Epileptic Seizure Diagnosis Among Veterans From 2004-2014

Arjumond Khan, Nora Proops, Joshua Flaherty, Brenda Fenton, Mary Jo Pugh, Kei Cheung, Joseph Goulet, Cynthia Brandt, Hamada Altalib

Objective:

Describe the change in the number Veterans diagnosed with psychogenic non-epileptic seizures (PNES) in the Department of Veterans Affairs (VA).

Background:

Of the nearly 1 million veterans who served in Operations Iraqi Freedom, Enduring Freedom, and New Dawn (OIF/OEF/OND) who received care between 2004-2014, approximately 4000 were diagnosed with a seizure disorder based on VA diagnostic coding. Many veterans who carry the diagnosis of epilepsy suffer from PNES and require dedicated mental health services. Many veterans with PNES suffer from post traumatic stress disorder, traumatic brain injury, and delay in care. Our retrospective cohort study will explore risk factors and protective factors, utilization of services, barriers to services, and outcomes of veterans with newly diagnosed PNES. Here we report our preliminary findings of cumulative prevalence of OIF/OEF/OND veterans with PNES from 2004-2014.

Design/Methods:

We used data from the Women Veteran Cohort Study (N=985,750) to identify Veterans in VA care with epilepsy or other seizure disorder diagnosis (ICD-9 code of 345 or 780.39) from 2004 to 2014. Since there is no ICD-9 code to identify Veterans with PNES in the VA national database and the ICD-9 code for conversion disorder (300.11) has not been readily used by neurologists to label PNES, we used an electronic health record informatics text tool called Voogo to identify patients

with PNES as documented in neurologists' progress notes and described elsewhere. Cumulative prevalence of PNES per 1000 Post 9/11 was calculated yearly from 2004-2014.

Results:

The cumulative prevalence of PNES in the VA system is increased from 0.0727 to 0.3662 per 1000 OIF/OEF/OND Veterans (a 122.7% increase) from 2004 to 2014.

Conclusions:

The number of PNES cases identified steadily increased each year from 2004-2014 and the burden of PNES in the VA healthcare system has doubled during that decade.

Post-Traumatic Psychogenic Seizure and Epilepsy Project

Award Number #: EP160049

PI: Hamada Hamid Altalib **Org:** VA Connecticut, West Haven, CT **Award Amount:** $533,881

Q1: Project Description

Aim 1: **Describe the change in prevalence of newly diagnosed Veterans with post-traumatic and non-traumatic Psychogenic Non-Epileptic Seizures (PNES) in the VA Post 9/11 population over time.**
Aim 2: **Describe the risk factors (Female gender, PTSD, Depression, Anxiety, Military Sexual Trauma, Chronic Pain, TBI) for PNES including PNES subsequent to TBI (PTPNES)**
Aim 3: **Explore whether prior psychotropic and psychotherapeutic treatments for mood and anxiety disorders decrease the risk of developing PNES.**
Aim 3a (Exploratory): **Explore whether prior psychotropic and psychotherapeutic treatments for mood and anxiety disorders decrease the severity of PNES (number of monthly psychogenic seizures) and increase the likelihood of recovery (seizure-free for six months).**

The study is a retrospective cohort study. There is no target number of subjects required. We will continue to gather data on Veterans identified with likely PNES.

Q3:

Table 1: Descriptive and bivariate characteristics of study population (N=793)

	Male N=657 (83 %)	Female N=136 (17%)
Demographics		
Age, Mean (SD)	34 (7.6)	34 (7.6)
Ethnicity, N (%)		
White	523 (80%)	72 (53%)
African American	62 (9%)	42 (31%)
Hispanic	39 (6%)	18 (13%)
Other	30 (5%)	4 (3%)
Unknown	3 (.5%)	0
Mental Health Comorbid Conditions, N(%)		
PTSD	552 (84%)	104 (76%)
Traumatic Brain Injury	261 (40%)	35 (26%)
Major Depression	250 (38%)	55 (40%)
Schizophrenia	9 (1%)	3 (2%)
Bipolar Disorder	151 (23%)	41 (30%)
Anxiety Disorder	330 (50%)	87 (64%)
Alcohol Abuse	234 (36%)	19 (14%)
Drug Abuse	180 (27%)	25 (18%)
Report Military Sexual Trauma, N(%)	22(3%)	61 (45%)

We have reviewed Veterans with PNES from the Women Veteran Cohort Study (WVCS) (N=985,750). Preliminary results of Table 1 (above) were presented as an abstract to the American Academy of Neurology's Annual conference in 2018. We have identified an additional 109 Veterans with PNES through our algorithm , who are currently validating, and are extracting ICD-10 data as well.

Q2: Summarize the Project Benefits and Innovations

Characterize risk factors, including risk factors including gender, PTSD, Depression, Anxiety, Military Sexual Trauma, Chronic Pain, TBI, for all subjects.

Characterize psychotropic and psychotherapeutic interventions of entire cohort to analyze the impact of psychotropic and psychiatric interventions in preventing PNES.

Analyze the impact of risk factors on the incidence of PNES.

Analyze and compare the utilization of health services between PNES, epilepsy and other veterans.

A major component of our research is to link Department of Defense (DoD) data sources to VA data.

Updated: (October 13, 2018)

Q4: Key Study Findings

The cumulative prevalence of OIF/OEF/OND veterans with PNES from 2004-2014 has steadily increased each year from 2004-2014.
The burden of PNES in the VA healthcare system has doubled during that decade.
We found both male and female veterans with PNES reported PTSD. A large majority (87%) of veterans received therapy for PTSD prior to PNES diagnosis, further research may confirm that PNES requires a separate and specific treatment modality.
Preliminary analysis of the PNES male veterans population were found to report TBI as a comorbid condition, as compared to female veterans who report Military Sexual Trauma as a comorbid mental health condition.