Award number: SCIRF 11-006

Grant awardee: Yue Cao, PhD, MSPH

Grant Title: The Application of Medical Sociology to the Study of Health and Mortality after Spinal Cord Injury

Aim 1

“In collaboration with Dr. Anbesaw Selassie (SCI surveillance system) and with Dr. Michael DeVivo of the University of Alabama-Birmingham (consultant to South Carolina in SCI database), Dr. Cao will develop research that will bridge the gap between the research done in South Carolina and that being done nationally through the SCI Model Systems.”

Summary
Over the past four years, I have collaborated with Dr. Anbesaw Selassie (South Carolina Spinal Cord Injury surveillance system) and with Dr. Michael DeVivo and Dr. Yuying Chen (National Spinal Cord Injury Statistical Center) to bridge the gap between the research done in South Carolina and that being done nationally through the SCI Model Systems. We have published a total of 4 manuscripts in the peer-reviewed journals, and have completed 8 presentations in national or international conferences, and 1 presentation in SCI Grand Rounds of College of Health Profession at MUSC. Among them, I served as the leading author for 3 manuscripts and 5 presentations.

a. Identifying risk factors for mortality after hospital discharge by using the South Carolina SCI surveillance data.

Manuscript published:

Presentation completed:

b. Collaborating with Dr. Anbesaw Selassie to study the SCI incidence change from 1998 to 2012 in South Carolina by using South Carolina SCI
surveillance data, identifying a disturbing trend with an increased incidence of SCI during the 14 years period.

Manuscript published:

Presentation completed:


Cao, Y. “Subjective and Objective Environmental Factors’ Influence and Spinal Cord Injury.” Presented in SCI Grand Rounds of College of Health Profession at Medical University of South Carolina: November 2014.

c. Developing studies that intend to bridge the gap between the research done in South Carolina and that being done nationally through the SCI Model Systems in collaboration with Dr. Michael DeVivo and Dr. Yuying Chen.

Manuscript published:


Presentation completed:


**Aim 2**

“Perform research with databases from South Carolina including studies by Dr. James Krause and Dr. Lee Saunders, as well as data from future studies using clinical data. The goal will be to perform scholarly activities and to serve as the basis for further research and program development.”

**Summary**

I have performed research with databases collected by Dr. James Krause and Dr. Lee Saunders. We have published a total of 10 manuscripts in the peer-reviewed journals, and had 3 manuscripts under review right now. We also completed 11 presentations in national or international conferences. Among them, I served as the leading author for 6 manuscripts and 4 presentations.

- Performing research with databases from South Carolina with Dr. Krause.

**Manuscript published:**


**Manuscript under review:**


**Presentation completed:**


b. Performing research with databases from South Carolina with Dr. Saunders.

**Manuscript published:**

**Manuscript under review:**

**Presentation completed:**


Aim 3

“Develop a research proposal by the end of the second year, with the goal of obtaining funding that will solidify Dr. Cao's position and serve as the building block for his career.”

Summary

I have contributed to 10 research proposals as an investigator. One of them was funded.

Grant Proposals Funded:
Risk of Early Mortality after Spinal Cord Injury
Agency: National Institute on Disability and Rehabilitation Research
Type: Field Initiated Research Grant (PI: Dr. James Krause)
Grant Total: $ 600,000
Role: Co-I

The overall goal of this project is to identify risk and protective factors for both all-cause mortality and for specific causes of mortality for people with spinal cord injury. The proposed aims include: (a) testing new health and socio-environmental predictors of mortality, (b) using longitudinal time-dependent covariates and identifying the association of change in risk and protective factors with mortality, (c) identifying causes of death and comparing the pattern of observed deaths to expected deaths, and (d) using a competing risk model to identify risk and protective factors of specific causes of death.

Grant Proposals Not Funded:
Risk of Adverse Outcomes After SCI: A Longitudinal Study (NIH competing renewal submitted May 2012), not funded
Risk of Early Mortality after Spinal Cord Injury (FIR submitted Jan 2013), not funded
Risk and prevalence of self-reported chronic health conditions after traumatic neurologic injury (DRRP on health and function submitted July 2013), not funded
Understanding and Promoting Healthy Aging for Individuals with Long-term Physical Disability (RRTC on Aging submitted August 2013), not funded
RRTC on Disability in Rural Areas (submitted August 2013), not funded
The Center on Capacity Building in Rehabilitation Research at Minority Serving Institutions (RRTC underserved submitted August 2013), not funded
Aging Related Health Decline and Catastrophic Life-changing Events among Long-term Survivors with Spinal Cord Injury: A 45-year Longitudinal Study (DRRP on health and function submitted Jan 2014), not funded
Predicting Health Trajectories and Secondary Health Conditions after Disability due to Spinal Cord Injury: A 20-Year Longitudinal Study (DRRP on health and function submitted April 2015), not funded

Aging and Community Living: 45-Year Longitudinal Study of Those with Spinal Cord Injury (DRRP on Community Living submitted April 2015), not funded

Project Value to the State of South Carolina

This recruitment funding made it possible for me to be fully committed to Spinal Cord Injury research and spend my time to address significant challenges to the quality of life and longevity of people with SCI in South Carolina. I used my expertise in Medical Sociology theory and method to evaluate the association between contextual factors, including environmental factors and personal socioeconomic conditions, and the key outcomes after SCI in South Carolina. My studies investigated the neighborhood’ impacts on SCI incidence and SCI outcomes in South Carolina. We found out the more disadvantaged a neighborhood was, the higher the SCI incidence in that area, and neighborhood disadvantages had significant independent impacts on people’s mental health after SCI. We also studied the mortality after SCI in South Carolina, and found mortality after SCI in South Carolina was 3.6 times higher than that of general population. We identified 7 factors significantly associated with the risk of death after discharge from acute care facilities: number of comorbidities, admission into trauma centers, advancing age, type of insurance, injury level and completeness, and being a man. We also extend SCI research by incorporating multiple data sources, including survey data collected from other states and national model system data. We found people with chronic SCI reported a range of environmental barriers and obstacles, and the physical aspects of environment were associated with their subjective physical and mental health. Other interesting findings indicated the consistent disparities in subjective well-being related to household income, and the significant association between low income and excess mortality after SCI. All these studies complement existing SCI research in South Carolina, and enhance our ability to identify individuals and areas at risk for excess mortality and undesirable health outcomes. They have important clinical and policy implications for future prevention and intervention programs in South Carolina.
Attachment

Figure 1. Presentation in the annual conference of the American Spinal Injury Association, Chicago, IL: May 2013.

Figure 2: Presentation in SCI Grand Rounds of College of Health Profession at Medical University of South Carolina: November 2014.