Enhancing Data Collection and Analyzing the Effectiveness of Fall Prevention Programs

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Background

The Stony Brook Trauma Center offers fall prevention programs to reduce the risk of unintentional injuries. The purpose of the fall prevention program is to reduce the risk of fall, injury, and death among people over age of 65. There are a variety of interventions available that aim to improve balance and muscle functions, including Stepping-On Workshop, Lessons in Tai Chi for Arthritis, and Matter of Balance Workshop.

Trauma center has trauma databases in Qualtrics and REDCap. Data collected from Trauma Registry and state & local statistics are utilized to assess the needs, trace participation process, and analyze the program impact. The main purpose of this project is to develop a trauma database to trace participants' demographic information, program attendance, and survey response utilizing data wrangling strategies.

Goals

Aligning with the mission of the health analytics concentration, this practicum project aims to utilize health analytical skills to evaluate the current practice and prepare research-ready datasets. Through analyzing data collected from on-going fall prevention programs, we can provide suggestions for conducting evidence-based interventions in the future.

The additional purpose of the practicum project is to evaluates the effectiveness of the fall prevention program through comparing fall counts, self-perceived risk of falling, and self-reported health in pre-test and post-test. Additional focus of the study is to identify factors associated with program completion.

Methods

Sample: Data are collected from the Trauma Registry and fall prevention program. Types of data collected are registration reports, attendance, and pre/post surveys. 1516 observations are included in the data analysis.

Measures:

- Methods to develop research-ready datasets including data indexing, data cleaning, and data reshaping will be employed to process raw data and prepare research-ready data.
- The program evaluation employed pre/post study design to determine the impact of interventions in reducing the incidence of falls and perceived risk of falling among participants.

Findings

Demographic Information	
Age group	Ranges from 47-94
Race/ethnicity	White (91.01%), Others (8.99%)
Sex	Male (19.62%), Female (78.90%)
Education	High School and under (13.60%), College and higher (83.74%)

Table 1. Demographic Information

Program Completion Rate	
Steping On	62.31%
Taichi Part 1	51.78%
Taichi Plus	56.19%
Overall	56.36%

Table 2. Comparative Program Completion Rate

Predictors	Estimate	S.E.	P-value
Age	-0.0017	0.005	P=0.7476
Sex	-0.7354	0.751	P=0.3045
Race/ethnicity	0.0751	0.472	P=0.8737
Education Level	0.3742	0.786	P=0.7347
Self-report Health	0.1562	0.200	P=0.4364
Number of Fall	-0.2892	0.155	P=0.0614
Number of Injury	-0.1191	0.211	P=0.5729
Number of Chronic Conditions	-0.089	0.092	P=0.3351
Number of Session Registered	0.4219	0.063	P=0.0942

Table 3. Summary Table of Completion Rate and Predictors

Predictors	Mean Difference
Self-report Health	1.1315
Number of Fall	-2.5672
Number of Injury	-0.1765
Self-perceived Risk	-0.1823
Self-perceived Fear	-0.1348
Protection	0.3049
Strength	0.3862
Steady	0.3838
Exercise	0.3227
Activity Level	0.2596
Attitude towards Life	0.1624

Table 4. Comparative Fall Measurements by Pre/Post Completion

Competencies Addressed

CEPH Competencies

- Evidence-based Approaches to Public Health
- Planning and Management to Promote Health
- Project: Conduct a research project related to population health

Heath Analytics Concentration Competencies

- Analytical thinking: applying analytical and conceptual models for public health
- Methods: Utilize a suite of methods appropriate for analyzing public health data

Conclusions/Lessons Learned

- Difference in completion rate indicates that the length of the program and content of the program may influence the participation.
- The further steps for data analysis are seeking for evidence for how to improve program completion rate.
- The program completion rate is positively associated with race/ethnicity, education level, self-report health, the number of sessions registered and negatively associated with age, sex, number of fall, injury, and chronic conditions.
- Findings are yield to limitation of missing data, clustered sample, and low survey response rate; therefore, they cannot be generalized to the general population or other settings.
- Having solid data collection and analysis approach will support the evident-based practice.
- As the delivery of virtual session is moving forward, more improvement on data collection and analysis method can be made in order to enhance the current practice of fall prevention programs.

References

Etman, A., Wijlhuizen, G. J., van Heuvelen, M. J. G., Chorus, A., & Hopman-Rock, M. (2012). Falls incidence underestimates the risk of fall-related injuries in older age groups: a comparison with the FARE (Falls risk by Exposure). Age and Ageing, 41(2), 190–195. https://doi.org/10.1093/ageing/afr178

Ladowski, K. (n.d.). Kristi Ladowski, MPH - linkedin. Linkedin. Retrieved October 9, 2021, from https://www.linkedin.com/in/kristi-ladowski-mph.

Stony Brook Trauma Center. (n.d.). Fall prevention for adults. Retrieved September 25, 2021, from https://trauma.stonybrookmedicine.edu/injury-prevention/falls.

Stony Brook Trauma Center. (n.d.). Injury prevention programs. Retrieved September 25, 2021, from https://trauma.stonybrookmedicine.edu/injury-prevention/programs

Thomas, E., Battaglia, G., Patti, A., Brusa, J., Leonardi, V., Palma, A., & Bellafiore, M. (2019). Physical activity programs for balance and fall prevention in elderly: A systematic review. Medicine (Baltimore), 98(27), e16218–e16218. https://doi.org/10.1097/MD.0000000000016218