BASE Falls Prevention Program – Process Improvement

ABSTRACT: Creating a falls prevention program is essential for providing comprehensive care for the aging population. The BASE program at Owensboro Health Healthpark was established 4 years ago to address the needs of the surrounding community. The objective of the on-going clinical process improvement program has been to validate the BASE program's fall prevention intervention, standardize clinical operations and referral pathways, and expand services such as nutrition support, optometry, and podiatry to provide a value-based, multi-disciplinary approach to fall prevention. Initial review of the program has shown both a clinically and statically significant change in the BERG score with an average of 4–13-point improvement from baseline and the DGI (Dynamic Gait Index) score with an average of 3-to-7-point improvement. These factors strongly correlate with increased strength and balance in patients who completed the program which has proven to be protective against falls. As the project continues, the addition of the multi-disciplinary team, expanded testing, and process standardization will hopefully further enhance the quality, safety, and efficacy of program.

BACKGROUND: Falls prevention is an integral component for providing comprehensive care to the aging population. According to the CDC, each year over 25,000 older adults die from fall-related events. Many of these events could have been prevented with early intervention and directed therapy. For these reasons, the Institute for Healthcare Improvement (IHI) has made mobility screening and treatment one of its core components for an age-friendly institution to achieve. The BASE program represents a 4-year outreach program by Owensboro Health Healthpark to create a community-based falls prevention program. The program's core objectives were to improve stability and strengthen muscles in aging patients. The purpose of the ongoing clinical process improvement program is to determine the clinical effectiveness of the intervention, expand services to create a comprehensive falls program, and standardize clinical referral pathways for better integration within the healthcare system and community providers. The program's objectives and process improvement goals have been evaluated and approved by the University of Louisville as non-human subject research and was approved as a clinical process improvement by the Owensboro Health research review committee.

METHODS: The BASE fall prevention program operates at the Owensboro Health Healthpark with reviewed enrollment from 2017 to 2020 for data analysis with ongoing quality control efforts. The program consists of a 12-week; physical therapist lead, strength, and balance course. An initial intake is completed one-on-one with the physical therapist which establishes the patient's baseline BERG and DGI scores. Inclusion criteria for the program consisted of patients who had a fear of falling, had a previous fall, recognized a declining strength, balance, agility, or coordination problem, were released for participation by their physician, willing to undergo screening assessments, and were not fully dependent on the mobility device for ambulation. Exclusion criteria were individuals who were not cleared for participation by their physician, or the medical director of the Healthpark based on their health status and individuals who were fully dependent upon the mobility device for ambulation. According to Donoghue (2009), a minimal detectable change in the BERG score is necessary to be 95% confident that a true change has occurred. For patients, whose initial scores are between 45-56, a 4-point increase is required for 35-44 a 5-point change, for 25-34 a 7-point change and lastly for those < 24 a 5-point change. The BERG scores were stratified and analyzed to these thresholds to validate a clinically significant improvement. The DGI scores were stratified into subgroups to allow for comparison. According to current practice standards, the minimal clinically significant change was established as a 4-point increase, irrespective of the pre-intervention score. A t-test analysis was performed on the pre and post-scores as stratified above. The mean score, standard deviation, confidence intervals, and p values were calculated for each intervention level in the BERG and DGI score.

RESULTS: The average age was 78.8 [SD 7.53, range 45-93]. A total of 120 patients completed the program for evaluation with BERG and DGI scores from 2017 to 2020. Patients, whose initial BERG score was between 41-56 had a pre-intervention average of 49.5±3.60 with an average change of 4.18 [SD 2.84, $p<0.05$]. In the 21-40 group the average initial BERG score was 35.0±3.42 with an average improvement of 11.47 [SD 5.85, $p <0.05$] and lastly for initial BERG scores < 20 the average score was 16.2±2.52 with a change of 9.33 [SD 1.15, $p<0.05$]. The BERG scores were stratified into ranges to evaluate for a minimal detectable change. The top group was subdivided into a 45-52 range, to allow for a maximum 4-point change to be observed given the maximum score is 56. Patients who initial scores were > 53 had an average change of 1.48 [SD 1.12, $p=0.24$] which is expected given the less than 4-point potential for change. Patients whose initial BERG scores were 45-52, had an average change of 4.63 [SD 2.26, $p <0.05$]. In the 35-44 group, an average change of 9.16 [SD 3.85, $p < 0.05$]. In the 25-34 group an average difference of 13.83 [SD 6.71, $p<0.05$]. Lastly in the < 24 group a change of 9.3 [SD 1.15, $p < 0.05$] was observed. Each group had an average change greater than the minimal required change expected for clinical improvement with greater than 95% confidence. DGI scores were divided into ranges to analyze the average improvement in the score over the program. For patients, whose score was >28 there was no significant change in performance [Mean 1.50, SD 0.58, $p = 0.23$]. For those patients who initial DGI score was between 24 and 27,

there was an average improvement of 3.17 [SD 1.10, $p < 0.05$]. For 19 to 23, the improvement was 4.83 [SD 2.16, $p < 0.05$]. In the 14 to 18 range, the score increased by an average of 5.96 [SD 3.27, $p < 0.05$]. For the 9 to 13 range, the average improvement was 7.42 [SD 3.42, $p < 0.05$]. Lastly, those patients who have a score < 9 saw an increase of 5.83 [SD 3.37, p, 0.05]. Overall, there was a greater improvement in score with lower initial DGI scores. Each increase exceeded the minimal detectable change of 4 points which achieved both clinical and statistical significance.

DISCUSSION: The changes in the BERG and DGI scores pre and post intervention for patients were both clinically and statistically significant. Both measures exceeded the thresholds for the minimal detectable change and correlate strongly with an improved balance and strength. This data, however, represents only the initial stages of improvement. The program is currently ongoing and expanding its services to offer comprehensive nutrition, podiatry, optometry, wellness, and counseling services to further assist patients. The preliminary results, as demonstrated, suggest the BASE program has met and exceed its targeted objectives for fall's prevention in aging patients.