Balance Awareness and Stability Everywhere (BASE) Fall Prevention Program
Phase I Pilot: DMADOV Project (in progress)

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About the Program

The BASE program, first started in 2017, is a community-based falls prevention program operated through the Owensboro Health Healthpark.

Applying Lean Six Sigma

As apart of Owensboro Health and the Family Medicine Residency process to achieve IHI recognition as age friendly, the BASE program was evaluated according to DMADOV (Define, Measure, Analyze, Design, Optimize, and Validate) structure for clinical process improvement

Define

The goals of the DMADOV improvement program were the following:

- ***Achieve*** compliance with IHI Age-Friendly quality standards for mobility screening and evaluation (4Ms)
- ***Analyze*** the clinical improvements in the BERG and DGI assessments for patients who completed the program
- ***Expand*** clinical resources to offer comprehensive services to target all areas related to fall prevention
- ***Standardize*** clinical operations, referral pathways, and follow up to ensure process stability and usability across the system

Measure – Understanding Our Patients and Program

Program Structure

- 12-week, physical therapist lead strength and balance course
- Initial and final intake completed one-on-one with the physical therapist
- BERG and DGI scores pre/post intervention

Statistical Process Analysis

- A t-test analysis was performed on the pre- and post-scores as stratified based on the minimal detectable difference
- The mean score, standard deviation, confidence intervals, and p values were calculated for each intervention level in the BERG and DGI score

Inclusion/Exclusion Criteria

- **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, and were not fully dependent on the mobility device for ambulation.
- **Exclusion criteria** were individuals who were not cleared for participation

Minimal Detectable Difference (MDD)

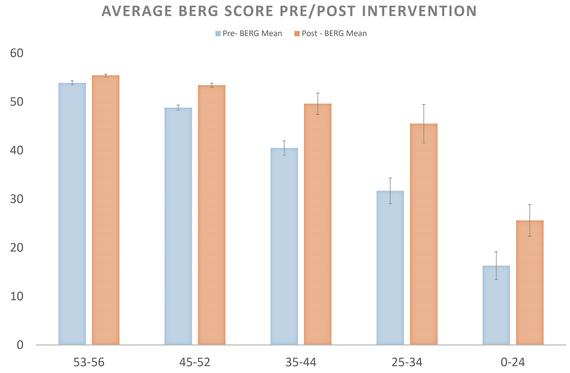
According to Donoghue (2009), a minimal detectable change in the BERG to be 95% confident that a true change has occurred is as follows:

BERG Score	Point Change
45-56	4
35-44	5
25-34	7
< 24	5

For the Dynamic Gait Index (DGI) an average improvement of ***4 points***, regardless of the initial score is considered significant

Analyze – Understanding the Changes in BERG and DGI

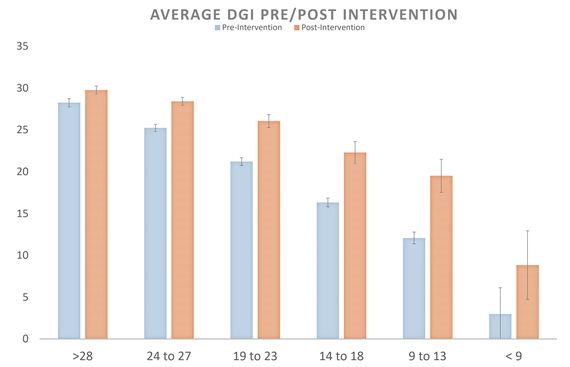
Changes In BERG Assessment



			Pre-BERG		Post-BERG		Difference		
MDD	Range	N	Mean	SD	Mean	SD	Mean	SD	P
4	53-56	27	53.9	1.091	55.4	0.801	1.48	1.12	0.24
4	45-52	65	48.8	2.17	53.4	1.77	4.63	2.26	P<0.05
5	35-44	19	40.5	3.31	49.6	4.88	9.16	3.85	P<0.05
7	25-34	6	31.7	3.29	45.5	4.95	13.83	6.71	P<0.05
5	0-24	3	16.3	2.52	25.6	2.89	9.3	1.15	P<0.05

Table/Figure 1: Shows the mean and standard deviation pre-intervention BERG score and the post- intervention BERG score. The mean difference in comparison to the minimal detectable change was calculated. For all ranges but the 53-56 group, there was a statistically and clinically significant improvement

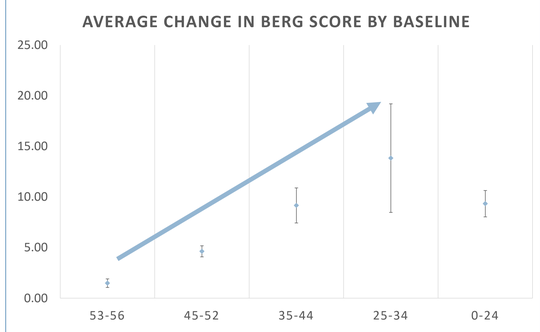
Changes in DGI Assessment



		Pre-DGI		Post-DGI		Difference		
Range	N	Mean	SD	Mean	SD	Mean	SD	P
>28	4	28.25	0.500	29.75	0.500	1.50	0.58	0.23
24 to 27	29	25.24	1.15	28.41	1.32	3.17	1.10	P<0.05
19 to 23	41	21.21	1.49	26.05	2.53	4.83	2.16	P<0.05
14 to 18	28	16.32	1.42	22.29	3.56	5.96	3.27	P<0.05
9 to 13	12	12.08	1.24	19.50	3.50	7.42	3.42	P<0.05
< 9	6	3.00	3.90	8.83	5.12	5.83	3.37	P<0.05

Table/Figure 2: Shows the mean and standard deviation pre-intervention DGI score and the post-intervention DGI score. The mean difference in comparison to the minimal detectable change was calculated. For all ranges but the >28 group, there was a statistically and clinically significant improvement

Analyze – Data Trends



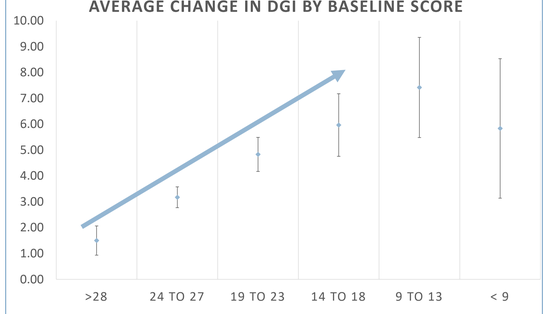


Figure 3: The average change in both the BERG and DGI scores demonstrated **increasing improvements** with lower baseline scores which were both ***clinically and statistically significant*** and strongly correlate with improved physical strength and fall prevention for patients

Next Phase

The program is currently ongoing with expanding clinical services, standardizing the flow of care, and optimizing referral pathways. The next steps of the process are to continue monitoring the quality, safety, and effectiveness of these clinical interventions.

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IRB Statement

The BASE program has been approved by the University of Louisville IRB as a DMADOV project for data collection, analysis, and implementation. Additionally, the project has been approved by the Owensboro Health Regional Hospital Research Review Committee as a quality improvement project.

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