

Correlation between Korean Fall Efficacy index and other parameters through exercises in elderly

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Objective

To identify the correlation between Korean Fall Efficacy index (KFES-I) and other gait ability parameters through the strengthening exercise program in elderly people

Methods

Between July 2015 and April 2018, patients who participated in the exercise program for preventing falls, and completed the evaluation before and after the program were enrolled retrospectively. We included patients aged over 60, those experienced a fear of falling, and those can gait independently even with gait orthoses, but complaining of disturbance during gait. The exercises was comprised of lower extremities and core muscle strengthening exercises following stretching exercises twice a week for 8 weeks. All participants were rated for fear of falling using KFES-I, the timed up and go (TUG) test, gait analysis, balance test using posturography, strength test using manual muscle test and isokinetic dynamometer, Berg Balance Scale (BBS), and functional status using modified Barthel Index (MBI). We compared these parameters before and after the program, especially KFES-I. In addition, we also compared these Results in two groups by ages.

Results

Of the 50 participants were enrolled. After the program, significant improvements were noted in the stride length on right side ($p=0.013$) in gait analysis, MBI ($p=0.012$), BBS ($p<0.000$), TUG test ($p<0.000$), and KFES-I ($p<0.000$). KFES-I was significantly correlation with MBI ($r=-0.35$, $p=0.013$). In addition, there was no significant difference between the group under 75 old ages and the others over 75 years.

Conclusion

In this study, participants showed an increase of their functional and balancing ability using the exercises for preventing the falls. Above all, an improvement in KFES-I suggest the decrease of fall-fear, which is significantly correlated with MBI scores. In addition, this effect was presented regardless of ages. Therefore, consistent exercise of stretching, strengthening, and balancing exercises may contribute to positive effect for preventing falling in older people.

| Parameters | Pre (N=50) | | Post (N=50) | | p value | |
|--|-------------|-------------|-------------|-------------|--------------------|-------------------|
| | Rt. | Lt. | Rt. | Lt. | Rt | Lt. |
| MBI | 90.70±9.78 | | 92.76±8.53 | | 0.012** | |
| BBS | 41.68±10.27 | | 44.72±9.88 | | <0.000** | |
| TUG | 21.25±16.14 | | 16.82±11.50 | | <0.000** | |
| KFES-I | 36.34±12.46 | | 30.64±11.89 | | <0.000* | |
| Cadence (steps/min) | 83.82±22.25 | 84.22±22.36 | 95.93±21.17 | 96.51±21.34 | 0.898 | 0.787 |
| Walking velocity (cm /s) | 69.56±27.87 | 70.01±28.51 | 72.21±30.9 | 73.92±32.04 | 0.115 | 0.058 |
| Stride Length (cm) | 83.82±22.24 | 84.22±22.37 | 87.17±26.07 | 84.87±29.35 | 0.013* | 0.588 |
| Gait analysis Stance phase (%) | 66.81±5.01 | 64.33±7.06 | 65.06±5.22 | 35.22±5.25 | 0.094 | 0.574 |
| Single support (%) | 34.93±5.81 | 33.20±5.00 | 35.22±5.25 | 34.13±5.23 | 0.677 | 0.088 |
| IDS | 16.08±5.07 | 15.63±5.28 | 15.39±4.3 | 15.42±5.18 | 0.029 | 0.624 |
| TDS | 15.80±5.08 | 16.25±5.02 | 17.25±14.74 | 15.25±4.05 | 0.565 | 0.119 |
| Isokinetic dynamometer 120°/s | 26.60±19.08 | 29.98±21.09 | 38.12±24.82 | 42.67±26.99 | 0.001* | <0.000* |
| 210°/s | 19.84±13.59 | 22.92±14.53 | 29.96±19.52 | 32.22±20.09 | <0.000* | <0.000* |
| Balance test WD I | 10.35±6.06 | | 11.48±8.24 | | 0.236 | |
| Stability index | 33.35±23.93 | | 31.71±18.99 | | 0.630 | |

Changes of parameters before and after the exercise program. *p value<0.05 (Paired T-test) **p value<0.05 (Wilcoxon-signed rank test) BBS: Berg balance scale, IDS: Initial double stance, KFES-I: Korean version of Fall efficacy international scale, MBI: modified Barthel index, TDS: terminal double stance, TUG: Timed up and go test, WDI: weight distribution index