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Research Article

Impact of Lower and Upper Body Strength between Different Three Age Levels in Male Active Older Adults

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ABSTRACT

Aim: This study aimed to investigate the selection of lower and upper body strength of male active older adults.

Methods: Participants (N=90) of older adults from Punjab were selected to act as subjects for the study. The study was delimited to the older male active older adults recruited at age group 60-70, 70-80, and 80-90 years respectively. For data collection, the active group of the subjects was divided into three categories i.e. category I (60-70 Years; N=30), category II (70-80 Years; N=30), and category III (80-90 Years; N=30) respectively. The chair stand test was used to measure the lower body strength and the arm curl test was used to measure the upper body strength. Statistical Package for Social Science (SPSS) version 23 was used to analyze the lower and upper body strength of male active older adults, after collecting data One Way ANOVA (Analysis of Variance), Least Significant Difference (LSD) Post Hoc test was employed. The level of significance to test the hypotheses was 0.05, ($P<0.05$).

Results: Outcomes of the studies in both variables found that there was a statistically significant difference in both the variables with a p-value of the lower body strength .000 ($P<0.05$) and p-value of the upper body strength was .015 ($P<0.05$) of male active older adults.

Conclusion: In conclusion, the study has revealed that changes in age-related decline of strength and the aging process always reduce physical activity. The lower and upper body strength changes with aging.

Keywords: Physical activity; Older adults; Body mass; Physical fitness

INTRODUCTION

The elderly process outcomes in significant deterioration in strength [1] Which is associated to complete body ill-health, improved, strength and reduced physical (P) and functional fitness (FF) [2-4]. Physical activity or exercises level and functional fitness (FF) among young aging (60-69 ages) and old aging (70-80 ages) persons with the hypothesis that an age-linked deterioration would originate. This study establishes that the decrease in physical activity or exercises level and functional fitness (FF) was identical for together males and females and was due to the elderly process. These alterations among young and old aging persons were due to the decrease of strength in together upper and lower limbs and variations in Body-fat Percentage (BP), flexibility (range of motion), agility (A), and endurance (E) [5]. It is well established that strength (S) is an effective technique to slow and in part reverse the age-associated loss of strength. Though clear procedures on the type and period of physical exercises have been printed [6] and universally predictable (such as 150 minutes of moderate- intensity or 75 minutes of vigorous aerobic activity/week for a smallest of (10) ten minutes per bout, strength training twice per week, and balance-enhancing workout), data recommend that only 5%-10% of adults meet these suggestions [7,8].

Thus, decreased training incidence in this population does not adversely affect extreme strength or Muscle Activity (MA) but can harmfully affect Muscle Mass (MM), even retrogressive training-induced improvements. Elder persons not training at least twice/week may conciliation potential rises in Muscle Mass (MM), essential in countering the effects of the elderly [9]. This HIIT-based simultaneous training program led to better enhancements in body composition (BC), muscle strength (MS), mobility (M), and balance (B) in healthy elder persons than a regular Low-Moderate-Intensity Continuous Training (LMICT); despite the decrease incomplete training volume [10]. The positive effect induced by WBV on upper- limb (UL) performance is only attained when the incentive is applied for the duration of the exercise. Though, WBV applied 60 seconds before Upper Body (UB) exercise outcomes in no benefit [11]. In conclusion, a higher weekly exercise frequency improved functional performance and strength (S) to a greater

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extent than lower frequencies in active elder females [12].

High-intensity Progressive Resistance Training (HIPRT) outcomes in significant enhancements in cognitive function (CF), muscle strength (MS), and Aerobic Capacity (AC) in elder adults [13]. Lower extremity muscle strength values had the strongest associations with participant functional performance. Lower body strength testing may provide additional value as an endpoint amount in the calculation and clinical management of sarcopenia [14]. HIICT produced improved variations in upper body strength than MICT. Finally, both HIICT and MICT had a comparable influence on strength (S) [15]. RT incidence on its own has significant effects on strength gain. It appears that advanced RT frequencies outcome in better gains in strength on multi-joint exercises in the upper body and females to elder adults [16].

It is generally found in most of the studies that changes in age-related decline of lower body strength and upper body strength and the aging process is always a reduction in physical activity. This study aimed to assess the lower body strength and upper body strength of different three age levels in active older adults. The study was entitled the "Impact of lower and upper body strength among different three age levels in active older adults".

MATERIALS AND METHODS

Subjects

The study was conducted with the purpose to investigate a study on select of lower and upper body strength between different three age levels in active older adults. The study was conducted on male active older adults; the age level was divided into three categories of active older adults i.e. male of 60-70, 70-80 and 80-90 years respectively. Participants (N=90) male active older adults from Punjab were selected to act as subjects for the current study shown in Figure 1 category, age group, and numbers of subjects selected for the study.

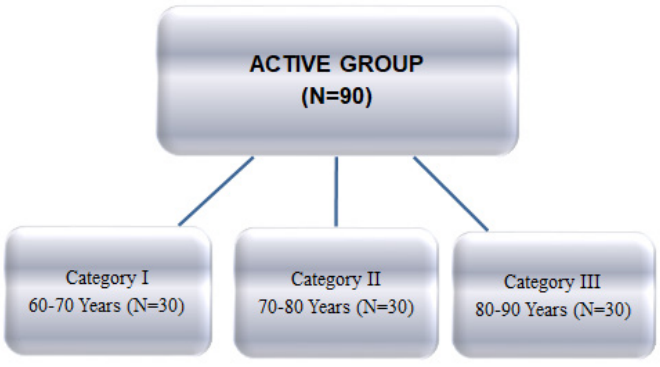

Figure 1: Showing category, age group, and numbers of subjects selected for the study.

Self- reported questionnaire

A self-reported questionnaire as per WHO guidelines was constructed to identify the active type of individuals. The questionnaire includes several types of questions related to types of activity performed i.e. moderate-intensity aerobic physical activity e.g. walking, brisk walking, and other activities of gardening 150 minutes/week or vigorous-intensity aerobic physical activity e.g. jogging, running, dancing, bicycle riding, aerobics exercise/gym, some yoga exercises, stretching exercises and callisthenic exercises 75 minutes/week or an equal combination of moderate and vigorous-intensity activity throughout the week. Respondents were questioned to mark (yes or no). The overall responses were analyzed to classify the type of individuals as per their activity type performed and were classified accordingly.

Protocol

Chair stand test: Objective: To measure the lower body strength of different three age levels in active older adults.

Tools required: Chair without armrests, pen, paper, and stopwatch.

Method used: The chair places it against a wall or then stabilizes it for safety or security. The participants sit in the center of the chair, with their feet shoulder-width apart, flat on the floor. The arms are to be crossed or overlapped at the wrists and held close to the chest. After the sitting position, the participants stand wholly up, then wholly back down and this is repeated for 30 (thirty) seconds. Amount the total number of whole chair stands (up and down equal one stand). If the participants had whole a full stand from the sitting position when the time is elapsed or gone, the final stand is calculated in the total.

Scoring: Scores are the number of count chair stands in 30 (thirty) seconds (Jones and Rikli, 2002) [17].

Arm curl test: Objective, The purpose of this test to determine the upper body strength of different three age levels in active older adults.

Tools required: 6 pounds weight, chair, pen, paper, and stopwatch.

Methods used: The purpose of this test is to do as various arm curls as possible in 30 (thirty) seconds. This test is shown on the prevailing arm side (or stronger side). The participants sit on the chair, holding the weight in the hand using a suitcase or luggage hold (palm facing towards the body) with the arm in a vertically down position beside the chair. Support the upper arm (UA) against the body so that only the lower arm (LA) is moving. Curl the arm up through a full range of motion or flexibility, progressively turning the palm up (PU). As the arm is let down through the full range of motion or flexibility, progressively return to the initial position. The arm necessity is fully bent and then fully make straight at the elbow. The procedure for the AAHPERD test defines the administrator's hand presence located on the biceps, and the lower arm (LA) necessity to touch the hand of the subject for a full bicep curl to be calculated. Replication of this action several times as likely within 30 (thirty) seconds.

Scoring: The score is the whole amount of measured arm curls completed in 30 (thirty) seconds (Jones and Rikli, 2002) [17].

Statistical technique: Statistical Package for Social Science (SPSS) version 23 was used to analyze the lower body strength and upper body strength of male active older adults, after collecting data one way ANOVA (Analysis of Variance) was significant, Least Significant Difference (LSD) post hoc analysis to determine individual group differences test were employed. The level of significance to test the hypotheses was 0.05, ($P<0.05$).

RESULTS

The results authenticated that, significant differences among three different age levels of male active older adults: 60-70, 70-80, and 80-90 for their Lower Body Strength. Table 1 revealed that the total number of subjects for the study was 90. The mean and standard deviation values of lower body strength of active older adults in 60-70 age, 70-80 age, and 80-90 age were 16.1333 ± 5.34166, 16.2667± 4.51001, and 8.7333 ± 3.81407 respectively. It is evident from

Table 2 that the results of Analysis of Variance (ANOVA) among three different age levels of male active older adults; 60-70, 70-80, and 80-90 on lower body strength were found to be statistically significant (P>0.05). Since the obtained "F" ratio 26.378* (.000) was found statistically significant. A glance in Table 3 showed that the mean value of lower body strength of active age category 60-70 was 16.1333 whereas the active age category 70-80 had a mean value of 16.2667 and the mean difference between both the groups was found -13333. The p-value sig .911 shows that the active age category 60-70 had demonstrated insignificantly better lower body strength than their active age category 70-80. The mean value of active age category 60-70 was 16.2667 whereas active age category 80-90 had a mean value of 8.7333. The mean difference between these groups was found 7.40000*. The p-value sig .000 showed that the active age category 60-70 had demonstrated better lower body strength than their active age category 80-90 significantly. The mean value of active age category 70-80 was 16.2667 whereas the active age category 80-90 had a mean value of 8.7333 and the mean difference between both groups was found 7.53333*. The p-value sig .000 shows that the active age category 70-80 had demonstrated better lower body strength than their active age category 80-90 significantly. The graphical representation of responses has been exhibited in Figure 2.

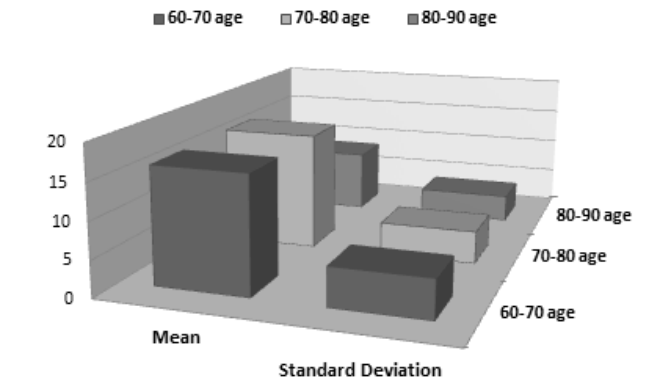

Figure 2: Mean and standard deviation results with regard to lower body strength among different three age levels in male active older adults.

Table 1: Mean and standard deviation results with regard to lower body strength between different three age levels in male active older adults.

Lower body strength	N	Mean	Std. deviation	Std. error
60-70 age	30	16.1333	5.34166	0.97525
70-80 age	30	16.2667	4.51001	0.82341
80-90 age	30	8.7333	3.81407	0.69635
Total	90	13.7111	5.76164	0.60733

Table 2: Analysis of Variance (ANOVA) results with regard to lower body strength among different three age levels in male active older adults.

Source of variance	Sum of squares	df	Mean square	F-ratio	Sig.
Between Groups	1115.289	2	557.644	26.378*	0
Within Groups	1839.2	87	21.14		
Total	2954.489	89			

* So result is significant at p<0.05 (The table values required for significance at 0.05 level with df (2, 87) =3.10 respectively)

Table 3: Analysis of Least Significant Difference (LSD) post hoc test with regard lower body strength among different three age levels in male active older adults.

Group (A)	Group (B)	Mean difference (A-B)	Sig.
60-70 age	70-80 age	-0.13333	0.911
(Mean=16.1333)	80-90 age	7.40000	0
70-80 age	60-70 age	0.13333	0.911
(Mean=16.2667)	80-90 age	7.53333	0
80-90 age	60-70 age	-7.40000	0
(Mean=8.7333)	70-80 age	-7.53333	0

Significant differences were found among three different age levels of male active older adults: 60-70, 70-80, and 80-90 for their upper body strength. Table 4 revealed that the total number of subjects for the study was 90. The mean and standard deviation values of upper body strength body of male active older adults in 60-70 age, 70-80 age and 80-90 age were 22.1667 ± 7.46986, 19.9667 ± 6.72865, and 17.1000 ± 5.59156 respectively It is evident from Table 5 that the results of Analysis of Variance (ANOVA) among three different age levels of male active older adults; 60-70, 70-80, and 80-90 on upper body strength were found to be statistically significant (P>0.05). Since the obtained "F" ratio 4.390*(.015) was found statistically significant. A glance in Table 6 showed that the mean value of upper body strength active age category 60-70 was 22.1667 whereas the active age category 70-80 had a mean value of 19.9667 and the mean difference between both the groups was found 2.20000. The p-value sig .203 shows that the active age category 60-70 had demonstrated insignificantly upper body strength than their active age category 70-80. The mean value of active age category 60-70 was 22.1667 whereas the active age category 80-90 had a mean value of 17.1000. The mean difference between these groups was found 5.06667*. The p-value sig .004 showed that the active age category 60-70 had demonstrated upper body strength than their active age category 80-90 significantly. The mean value of active age category 70-80 was 19.9667 whereas the active age category 80-90 had a mean value of 17.1000 and the mean difference between both groups was found 2.86667. The p-value sig .098 shows that the active age category 70-80 had demonstrated better upper body strength than their active age category 80-90 significantly. The graphical representation of responses has been exhibited in Figure 3.

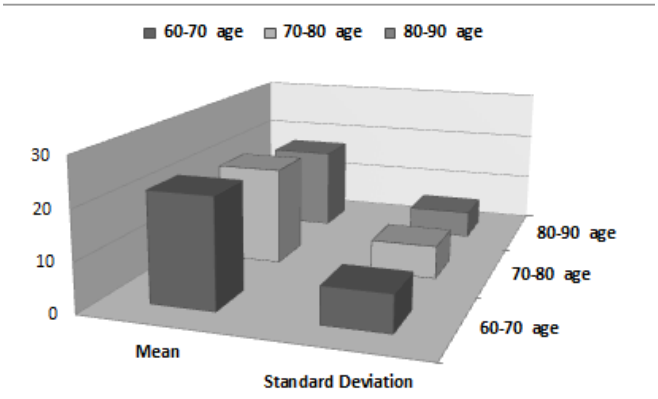

Figure 3: Mean and standard deviation results with regard to upper body strength among different three age levels in male active older adults.

Table 4: Mean and standard deviation results with regard to upper body strength among different three age levels in male active older adults.

Upper body strength	N	Mean	Std. deviation	Std. error
60-70 age	30	22.1667	7.46986	1.3638
70-80 age	30	19.9667	6.72865	1.22848
80-90 age	30	17.1	5.59156	1.22848
Total	90	19.7444	6.89009	0.72628

Table 5: Analysis of Variance (ANOVA) results with regard to upper body strength among different three age levels in male active older adults.

Source of variance	Sum of squares	df	Mean square	F-ratio	Sig.
Between Groups	387.289	2	193.644	4.390*	0.015
Within Groups	3837.833	87	44.113		
Total	4225.122	89			

* So result is significant at p<0.05 (The table values required for significance at 0.05 level with df (2, 87) =3.10 respectively).

Table 6: Analysis of Least Significant Difference (LSD) post hoc test with regard upper body strength among different three age levels in male active older adults.

Group (A)	Group (B)	Mean difference (A-B)	Sig.
60-70 age	70-80 age	2.2	0.203
(Mean=22.1667)	80-90 age	5.06667*	0.004
70-80 age	60-70 age	-2.2	0.203
(Mean=19.9667)	80-90 age	2.86667	0.098
80-90 age	60-70 age	-5.06667*	0.004
(Mean=17.1000)	70-80 age	-2.86667	0.098

*Significant at F 0.05=3.10

DISCUSSION

The outcomes of this study that there were significant differences between three different age levels of male active older adults: 60-70, 70-80, and 80-90 for their lower body strength and upper body strength. This study showed that the mean value of lower body strength of active age category 60-70 was 16.1333, 70-80 was 16.2667, 80-90 was 8.7333, and the mean value of upper body strength the active age category 60-70 was 22.1667, 70-80 was 19.9667, and 80-90 was 17.1000 respectively. Significant differences (P<0.05) were found for all Senior Fitness tests between young elderly (60-69 years) and old elderly (70-80) men. From the standpoint of energy ingesting assessed by the International Physical Activity Questionnaire (IPAQ), Moderate Physical Activity (MPA) is dominant. Also besides, with elderly, between males and females elder than 60 or sixty years, in total Physical Activity (PA) significantly decreases (P<0.05) [5]. A 2-way analysis of variance was measured to test for interaction among training programs and groups. The group × time interaction showed significant improvements for the parameters ($p \leq 0.05$) and physical functioning (muscle strength: p<0.001; mobility: p<0.001) whereas the control group continued unchanged ($p \geq 0.05$) [9]. PRT or progressive resistance training increased upper, lower (SMD=0.94, 95% CI=0.69-1.20) and whole-body (SMD=0.84, 95% CI=0.62-1.05) strength significantly more than imitation exercise. Higher- strength scores were significantly related to enhancements in cognition (P<0.05). Greater lower body strength (LBS) significantly simplified the effect of PRT enhancements [13]. Significantly related across all functional result measures the Physical Performance Test (p<0.02) [14].

A significant difference was found in the arm curl test, where high-intensity interval training HIICT was statistically better than moderate-intensity continuous training MICT and control group. In lower limb strength high-intensity interval training and moderate-intensity continuous training were statistically better than the control group [15]. The subcategory analysis for the upper and lower body found a significant difference of frequency (p=0.004) for the upper body [16].

High-load Resistance Training (HL) training, rises in all strength measures, and cross-sectional area (CSA) were evident and the gains were significantly greater than the control group (P<0.05). The blood flow restricted group had strength rises in leg extension and leg press 1-RM tests but were significantly lower in leg extension isometric maximum voluntary contraction (P<0.01) [18].

Strength- type activity can be an effective exercise for elder females. This study was significantly improved in the strength exercise group (SEG), but reduced in the Control Group (CG). Furthermore, there was an interaction effect (p<0.001) among time and group. Strength- type activity has enhanced upper and lower body strength [19]. Female ages 70-83 years had muscle thickness calculated by ultrasound. Strength was significantly linked with forearm-ulna in muscle thickness together males and females [20]. The findings designate both age- and sex-related differences in activity designs. Upper body strength was observed in the females, while males achieved more strenuous work expending their lower bodies (LB), signifying gender-based differences. Males found significant irregularity in their humerus, with most showing right-hand domination for upper body events in middle and elder ages [21]. We find that the average of the alpha-age differences in the measures of upper body and lower body strength expects educational differences better than either physical measure [22].

This study examined upper-and lower-body power in men and women recruits, and recruits of different ages, women recruits and recruits aged 35+ years of age may be deficient in upper-and lower-body strength. Women and older recruits should participate in strength and strength training [23]. Upper-body strength (bench press (BP) and bench pull (BP)), and lower-body strength. The elite senior playing groups were stronger and had greater performance than the lower level players [24]. The Chair-based Aerobic Exercises (CAE) group better upper and lower body strength significantly (p<0.05). Both exercise groups showed a trend toward an increase in levels [25]. Significantly related with better physical function (PF) in the domains of lower body strength (LBS) [26]. Young (n=22, 18-31 years) and older (n=28, 59-76 years) males and the elder group were most affected for lower-body (LB) [27]. All study participant's skilled rises in upper and lower body strength (UBS) (p<0.001) [28].

CONCLUSION

In conclusion, the study has revealed that changes in age- related decline of strength and the aging process is always a reduction in physical activity. The lower and upper body strength changes with aging. The results authenticated that, significant differences among three different age levels of male active older adults: 60-70, 70-80, and 80-90 for their lower and upper body strength.

STATEMENTS

Author, I Pawandeep Kaur of Department Physical Education, Punjabi University Patiala, and Punjab, India. I am submitting of an original paper. This is to declare that my paper entitled "Impact of Lower and Upper Body Strength between different

three age levels in male active older adults." is a product of my independent research the manuscript represents valid work.

STATEMENT OF ETHICS

Ethical approval was not required for this study in accordance with local/national guidelines. Written informed consent from participants was not required in accordance with local/national guidelines.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest.

FUNDING SOURCES

Author was nothing the funding source of research article.

AUTHOR CONTRIBUTION

The contribution of my supervisor/co-author Dr. Nishan Singh Deol, Professor and Head of Department Physical Education, Punjabi University Patiala, and Punjab, India should be included in my research article. The author Pawandeep Kaur contribution to the own Ph.D. research work and writing of the manuscript should be specified in this section i.e. the author conceived the study design, data collection, data analysis and wrote the manuscript.

DATA AVAILABILITY STATEMENT

This study is concerned with functional fitness of different age group of older peoples. According to best of my knowledge this work is original and unpublished. This research paper is related to my Ph.D. research work. All data analyzed during this study are included in my Ph.D work. Further enquiries can be directed to the author.

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