



RESEARCH PAPER

Comparative Study of Male and Female Athletes about Effect of Stretching Exercises on Flexibility

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ABSTRACT

The present experimental research investigated the effectiveness of the stretching exercises to flexibility and Eighty athletes selected of age 18-24 years included (N=40) Female and (N=40) male athletes selected from different Universities of Punjab. The selected individuals divided into female and male group's separately along with 6 weeks training sessions, have stretching protocol which included separate sessions along with warm-up sessions. The six weeks stretching program showed improvement of 2.8% in female group and 1.7% in the male group respectively. The female stretching training revealed 1.1% more improvement as compared with male group. A group of control subjects (N=40) were also maintained for further comparison. The flexibility was measured through sit and reach test evaluated before training sessions as a pre-exercise and after 6 weeks as a post-exercise measurement. Pre and post-exercise evaluation had been analyzed by paired sample test and effect size of subjects also calculated through Cohen's D resulted 1.41 and 3.55 respectively. The subjects were followed for 4 months and check the recurrence rate of injuries, resulted 12.2% injuries in control group subjects while intervention group showed 7% and 9% respectively.

Introduction

Flexibility is defined as the range of motion, or movement around a particular joint or set of joints in other words it allows a subject to bend or turn to its max (Bernhart, 2013). During flexibility training the main emphasized on muscles and their fascia (sheath), while bones, joints, ligaments, tendons and skin do contribute to overall flexibility which has limited control over these factors

(Alter,2004). On the other hand, flexibility is different in every individual due to change in their muscle length and multi-joint muscles. Stretching on daily basis resulted change in characteristics of tissues and muscles within the body (Behmand and Chaouachi, 2011). Other tissues begin to adapt to the stretching process include the fascia, tendons, skin and scar tissue (Gleim& McHugh, 1997). The stretching exercises are commonly done before or after exercise as it perceived to loosen muscle, which allow muscle to go for workout condition by reducing their risk of injury (Ingraham, 2003;McHugh & Cosgrave, 2010).

Athletes has special requirement when it comes to flexibility which is common fitness component among female and male athletes which increase the range of motion (ROM) of athlete's around joints and muscles as well (Frederick and Frederick, 2017).According to the proponents, an increase in the performance of the flexibility before and after practice session or strength and conditioning workout lead to an increase in athletic performance as well as reducing the incidence of injury (Ingraham, 2003; McHugh & Cosgrave, 2010).It also increases the muscle length and its range of motion. There are procedures and latest techniques that exploit the doles and diminish the risk of injury (Manoel *et al.*, 2008).There are many different ways for strength training Similarly, many different ways of stretching exercise (Olivier*etal.*, 2016),which were not only one specific way of stretching was better than other stretching exercise, each type has its own rewards and difficulties, the most important stretching types is perfectly related to the purpose or goals of a subject needs to achieved (Reese and Bandy, 2016).For example, Ballistic stretching, dynamic stretching, PNF stretching static stretching and etc. Consequently, athletes and coaches regularly include stretching exercises in both training programs and in pre-event warm-up activities (Gleimand and McHugh, 1997). However, Stretching is commonly used in sport as a method of preparing the specific muscles to be used during the activity, as well as relaxing the muscles following exercise (Anderson, 2010). Upon undertaking a regular stretching program, frequent changes begin to occur within the body and specifically within the muscles itself as other tissues that begin to adapt the stretching process include fascia, tendons, skin and scar tissue (Pamboris, 2018)

An individual performance depends upon a number of components i.e. health related and skill related fitness and flexibility is an important factor among these components. Although flexibility is an important physical fitness component among others and it can be enhanced through regular exercise or training program which also help to all the components of physical fitness (Singh, 2018). Flexibility is directly proportional to the performance of athlete performance, if muscle is excessively tight and not as strong as it can ideally be (Manoel *et al.*, 2008). A weak muscle did not put load and thus, another muscle or group of muscles must do more work and becomes fatigued which put more load on the weak muscles. In athletes, it leads to decreased speed of movement, decreased strength and power which lead to injuries (Walsh, 2017). Regular flexibility training helps maintain range of motion, strength of muscles and prevent injury therefore it is important to

stretch all major muscles group regularly before and after workout during training session if you are an athlete(Norris, 2015). Stretching is commonly undertaken in practice and matches as before and after performing in game or it can also be done as part of training session as well which is suppose as a relaxation of muscles, that prepared for a specific training session and helped in reduction of risk in sports injury (McHugh and Cosgrave 2010). With stretching, subsequent gains in muscle lengths which resulted in lead to improved recital and reduce recurrence of injury. The scholar has evidence that male adaptation to fitness was better than female, whereas female has been shown to reveal enhanced flexibility as compared with male (Jan and Yadav, 2017). Additionally, the current study has examined the changes over 6 weeks exercises resulted that, male athletes did not get as much as values of range of motion (ROM) as female athletes do (Manoel *et al.*, 2008). There are number of researchers that conduced research on stretching exercises and concluded that no effect could be calculated after static stretching exercises but Proprioception Neuromuscular Facilitation (PNF) exercises has strongly impacted on the flexibility (Funk *et al.*, 2003).

Hypothesis

The study hypothesized that comparison of male and female athletes about effect of stretching exercise on flexibility (ROM) is an effective method to manage the impact of flexibility and also cut down the injury rate.

Material and Methods

Eighty athletes were selected of age (18-25 years) which includes (N=40) female athletes and (N=40) male athletes from university of Punjab, Lahore campus. The method of study was an experimental with purposive sampling technique was utilized. Additionally, athletes had no history of injuries in past 6 months or one year. To examine the hypothesis of the study, pre-experimental design was used to examine the effect of stretching exercises on performance. The Kolmogorov-Smirnovtest applied to the data and it was observed that data was assumed to be slightly normal. The pre-exercise evaluation had been taken to get the initial or started values through sit and reach test of flexibility. After 6weeks stretching exercises program (SEP) and included separate stretching training session as well. The stretching exercises divided into two training sessions (N=40) of male athletes SEP and (N=40) of female athletes (SEP) that participated in this research, while (N=40) subjects were taken as a control group including male and female athletes to analyze the comparison of male and female athletes in accordance to the stretching exercises on flexibility. Then the researcher conducted pre-exercise evaluation (measurements) of male athletes (N=40) and female athletes(N=40) that were enlisted in data collection program before starting of SEP program. The test has been conducted without warm-up. For attain affective results, the researcher designed two session of training program in which each session keeps mixture of active static warm-up stretching protocol (ASWS) and active dynamic warm-up stretching protocols (ADWS) to increase flexibility of the subjects. Principal of progression specificity and overloading has been

implemented throughout the SEP. No one has been dropped from the sessions throughout the study as shown in Figure 1.

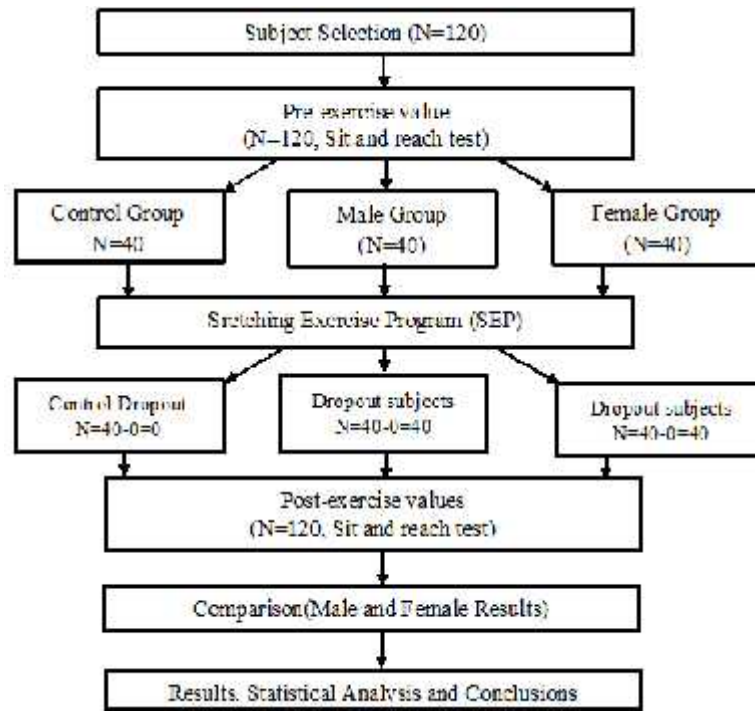


Figure.1 Shows the flow chart of the Stretching Exercise Program (SEP).

Shows the flowchart of the research, the data has been analyzed separately as pre-exercise and post-exercise values evaluated through sit and reach test evaluation. For both sessions the researcher selected at-least 8 dynamic stretching exercises protocols and 15 static stretching exercise protocols for the subjects. Fortnight, exercises has been added as per subject condition and situation. After 6 weeks training session program of male and female athletes the post-exercise evaluation has been taken from the subjects that were participated in either experimental group (N=80) or in control group (N=40) to check the improvement in flexibility of athlete due to stretching exercise.

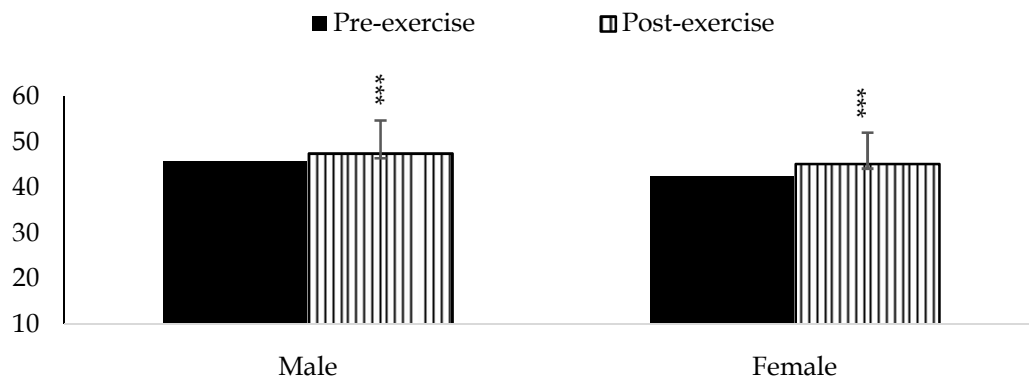
Results and Discussion

The experimental research descriptive techniques like frequency, mean, median, standard deviation and inferential techniques with paired sample t-test was applied and analyzed through statistical package for social sciences (SPSS) version 22.0. The effect size was also calculated for the comparison.

Table 1
Showing Pre and Post-exercise values evaluated through paired sample t-test along with difference, percentage t-value and p-value as well

Subjects Male/Female	Pre-exercise	Post-exercise	Diff (%)	t-value	p-value	Cohens D
Male	45.8 ± 5.4	47.5 ± 5.5	1.7 (3.7)	-18.9	*** 0.000	3.55
Female	42.4 ± 7.4	45.2 ± 6.9	2.8 (6.6)	-7.6	*** 0.000	1.41

***p<0.001 highly significant



The pre and post exercise values (Male) showed difference of 1.7 and 2.8 along with improvement (%) of 3.7 and 6.6 respectively. The result also showed significant improvement (p<0.001) through paired sample t-test.

Research Tool

Sit and reach test was used to test the individual's flexibility. This test was first described by Wells and Dillon (1952) this test is the most valid and reliable test to measure flexibility. The dimensions of the flexibility box were ((30×30)cm and (12×12)inches with height length and width respectively. The scale which was pasted at the top of the board showed measurements in both centimeter and inches. The measuring scale was extended from 0 started at the front edge of the top board of the box to the 53cm (21inches) just before the opposite edge of the top board of the box. The top board was extended 22.86cm (9inches) behind the place where foot was placed. The flexibility of subjects was measured in centimeters and the test was performed thrice as the average of 3 measurements was taken. The shoes should be off and the legs were straight in sitting position throughout the test.

Training Session

Stretching program was designed that worked on the specific muscles of the subject which was completed in duration of 6 weeks which include 2 sessions

of training program in which each session keeps a mixture of active static warm-up stretching protocol (ASWS) and active dynamic warm-up stretching protocols (ADWS) to increase flexibility of the subjects. For both sessions the researcher selected 8 dynamic stretching exercises protocols and 15 static stretching exercise protocols for the subjects.

The researcher focused on 12 major muscle groups stretching during training sessions which includes Shoulder muscle (deltoid, trapezius and scapula), Hamstring (bicep-femoris, semitendinosus and semimembranosus), Calf (gastrocnemius & soleus), Groin (adductor brevis, adductor longus, adductor magnus, gracilis and pectineus), Gluteus Maximus, Lower back, Middle back (paraspinal muscle or erector spinae and trapezius), Latissimus dorsi, Triceps brachii, Biceps brachii, Rectus abdominis, Quadriceps (rectus femoris).

Discussion

The main purpose of the study was to investigate the comparative study of male and female athletes about effect of stretching exercises on flexibility. This study was limited to all male and female athletes at University of the Punjab, Lahore. Main research questions were formulated in relation to the objective of the study, which was to identify comparison of male and female athletes about effect of stretching exercises on flexibility.

Conclusion

The major objective of the study was elaborating the “comparative study of male and female athletes about effect of stretching exercises on flexibility”. After careful handling and supervision of subjects and analysis of pre-exercise and post-exercise measurements of flexibility of the female and male athletes, researcher concluded that the flexibility of male and female athletes improved by the mean of pre-test 42.38 cm to post-test 45.19 cm and male athletes improved by in pre-exercise evaluation was 45.84cm to post-exercise evaluation 47.50cm respectively and thus performance definitely was increased. Results revealed that stretching exercises has a positive effect on flexibility of male and female athletes. Results also revealed that stretching exercises such as dynamic and static exercises along with Proprioceptive Neuromuscular facilitation (PNF) had positive effect on flexibility of players’ performance except this Result reveals that flexibility of female athlete’s flexibility measurement was increased as compared with male athletes. At the end researcher concluded that male and female athletes should perform stretching exercises on regular bases to enhance their flexibility and performance and flexibility of male athletes increased then flexibility of female athletes.

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