International Journal of Physical Education, Sports and Health 2021; 8(1): 242-245

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2021; 8(1): 242-245
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www.kheljournal.com
Received: 06-11-2020
Accepted: 14-12-2020

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Impact and analysis of gym ball and medicine ball training on motor fitness

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Abstract
The main aim of the present study was to find out the comparative impact of training with Gym Ball and Medicine Ball on Motor Fitness ability of sports related persons. Out of 90 students 60 male subjects were randomly selected from Chaudhary Charan Singh University, Meerut, Uttar Pradesh. 20 Subjects each was randomly and equally divided into three equal groups and was named as Group 'A' (Gym ball Group) Group 'B' (Medicine ball Group) and Group 'C' (Control Group) and accordingly training was given, whereas Group 'C' (Control Group) received no training. Variables undertaken were Abdominal Strength, Agility, Flexibility and Balance. In order to investigate the existence of significant difference in the effect of Training with Gym Ball and Medicine Ball on Motor Fitness among three groups, Analysis of Co-variance statistical technique was used. The result revealed that there was insignificant difference in the development of Motor Fitness through the exercises training between Gym ball and Medicine ball.

Keywords: gym ball, medicine ball, motor fitness, training

Introduction
Motor Fitness is necessary for success in most of the games and sports. Without a high level of motor fitness an individual will not be able to withstand the stress and strain caused on the body by various games and sports. Motor Fitness in addition to bringing about better performance in games and sports, also helps in prevention of injuries in the long run (Doneash Scaton *et al*., 1956) [2]. Every game needs different type of Motor Fitness. Motor Fitness differs from game to game because every games has its own rules, regulation and technique. Yet some times we find some games need high quality motor fitness and sometimes it is difficult to understand and differentiate the Motor Fitness between the two games (Doneash Scaton *et al*., 1956) [2]. Now-a-days to develop Motor Fitness various exercise materials are used such as Gym Ball and Medicine Ball. In order to investigate such subject matter of this thought and in order to study the degree of its logical authenticity in expecting the same as the established fact, such study has been undertaken.
Motor fitness is a term that describes an athlete's ability to perform effectively during sports or other physical activity. An athlete's motor fitness is a combination of five different components, each of which is essential for high levels of performance. Improving fitness involves a training regimen in all five.
There are many different manifestations of fitness. Some examples include strength, stamina, speed, and flexibility. Certain types of fitness, such as an athlete's cardiac fitness level, are more important than others. An athlete needs to be aware of the various types of fitness to develop an effective training program that focuses on weak or important areas.
Motor- performance fitness is defined as the ability of the neuromuscular system to perform specific tasks. Test items used to assess motor- performance fitness include chin-ups, sit-ups, the 50-yard dash, the standing long jump, and the shuttle run (a timed run in which the participant dashes back and forth between two points). The primary physical characteristics measured by these tests are the strength and endurance of the skeletal muscles and the speed or power of the legs. These traits are important for success in many types of athletics. Muscular strength and endurance are also related to some aspects of health, as stated above.
There is disagreement among experts about the relative importance of health-related and motor performance physical fitness. While both types of fitness are obviously desirable, their relative

values should be determined by an individual's personal fitness objectives. If success in athletic events is of primary importance, motor performance fitness should be emphasized. If concern about health is paramount, health related fitness should be the focus. Different types of fitness may be important not only to different individuals but also to the same individual at different times. The 16-year- old competing on a school athletic team is likely to focus on motor performance. The typical middle-aged individual is not as likely to be concerned about athletic success, emphasizing instead health and appearance. One further point should be made: to a great extent, motor-performance physical fitness is determined by genetic potential. The person who can run fast at 10 years of age will be fast at age 17; although training may enhance racing performance, it will not appreciably change the individual's genetically determined running speed. On the other hand, characteristics of health-related physical fitness, while also partly determined by inheritance, are much more profoundly influenced by exercise habits.

Principles of exercise training

Research in exercise training has led to the recognition of a number of general principles of conditioning. These principles must be applied to the development of a successful exercise program.

Specificity

The principle of specificity derives from the observation that the adaptation of the body or change in physical fitness is specific to the type of training undertaken. Quite simply this means that if a fitness objective is to increase flexibility, then flexibility training must be used. If one desires to develop strength, resistance or strengthening exercises must be employed. This principle is indeed simple; however, it is frequently ignored. Many fraudulent claims for an exercise product or system promise overall physical fitness from one simple training technique. A person should be suspicious of such claims and should consider whether or not the exercise training recommended is the type that will produce the specific changes desired.

Overload

Overload, the second important principle, means that to improve any aspect of physical fitness the individual must continually increase the demands placed on the appropriate body systems. For example, to develop strength, progressively heavier objects must be lifted. Overload in running programs is achieved by running longer distances or by increasing the speed.

Progression

Individuals frequently make the mistake of attempting too rapid a fitness change. A classic example is that of the middle-aged man or woman who has done no exercise for 20 years and suddenly begins a vigorous training program. The result of such activity is frequently an injury or, at the least, stiffness and soreness. There are no hard-and-fast rules on how rapidly one should progress to a higher level of activity. The individual's subjective impression of whether or not the body seems to be able to tolerate increased training serves as a good guide. In general it might be reasonable not to progress to higher levels of activity more often than every one or two weeks.

Warm-up/Cool Down

Another important practice to follow in an exercise program is to gradually start the exercise session and gradually taper off at the end. The warm-up allows various body systems to adjust to increased metabolic demands. The heart rate increases, blood flow increases, and muscle temperatures rise. Warming up is certainly a more comfortable way to begin an exercise session and is probably safer. Progressively more vigorous exercises or a gradual increase in walking speed are good ways to warm up. It is equally important to cool down—that is, to gradually reduce exercise intensity—at the end of each session. The abrupt cessation of vigorous exercise may cause blood to pool in the legs, which can cause fainting or, more seriously, can sometimes precipitate cardiac complications. Slow walking and stretching for five minutes at the end of an exercise session is therefore a good practice. The heart rate should gradually decline during the cool down, and by the end of the five minutes it should be less than 120 beats per minute for individuals under 50 years of age and less than 100 beats per minute for those over 50.

Frequency, intensity, and duration

To provide guidance on how much exercise an individual should do, exercise physiologists have developed equations based on research. It is generally agreed that to develop and maintain physical fitness, the exercise must be performed on a regular basis. A frequency of about every other day or three days per week appears minimally sufficient. Many individuals exercise more frequently than this, and, of course, such additional exercise is acceptable provided that one does not become over trained and suffer illness or injury.

The intensity of exercise required to produce benefits has been the subject of much study. Many people have the impression that exercise is not doing any good unless it hurts. This is simply not true. Regular exercise at 45 to 50 percent of one's maximal capacity is adequate to improve one's physiological functioning and overall health. This level of intensity is generally comfortable for most individuals. A reliable way to gauge exercise intensity is to measure the heart rate during exercise. An exercise heart rate that is 65 percent of a person's maximal heart rate corresponds to approximately 50 percent of his maximal capacity. Maximal heart rate can be estimated by subtracting one's age in years from 220 (or, in the case of active males, by subtracting half of one's age from 205). Thus, a sedentary 40-year- old man has an estimated maximal heart rate of 180 beats per minute. Sixty-five percent of this maximal rate is 117 beats per minute; thus by exercising at 117 beats per minute, this individual is working at about 50 percent of his maximal capacity. To determine exercising heart rate, a person should exercise for several minutes, to allow the heart rate to adjust. The exerciser should then stop exercising, quickly find the pulse, and count the number of beats for 15 seconds. Multiplying this by four gives the rate in beats per minute. The pulse must be taken immediately after stopping exercise, since the heart rate rapidly begins to return to the resting level after work has been stopped. As noted above, exercising at the 50 percent level of intensity will improve physiologic functioning and provide health benefits. This level of exercise will not produce the maximum fitness needed for competitive athletics.

Statement of the problem

The main aim of the study was to find out the comparative effect of training with Gym Ball and Medicine Ball on Motor Fitness ability of sports related persons.

Hypothesis

It was hypothesized that due to the comparative effect of training with Gym Ball and Medicine Ball there would not be

any significant differences on motor fitness ability of sports related persons.

Methodology

Out of 90 students 60 male subjects were randomly selected from Chaudhary Charan Singh University, Meerut, Uttar Pradesh. They were selected at random for the purpose of the study. The age of the subjects ranged between 21 to 27 years. 20 Subjects each were randomly divided into three equal groups and was named as Group 'A' (Gym ball Group) Group 'B' (Medicine ball Group) and Group 'C' (Control Group), Further Group 'A' was assigned fitness training with Gym ball and Group 'B' was assigned fitness training with Medicine Ball while no training was assigned to Group 'C' (Control Group).

Variables

On the bases of review of related literature, expert's opinions and research scholar's own Understanding the following variables have been undertaken:

1. Abdominal strength (core strength) was measured by the Bent knee sit up.
2. Agility was measured by 4 × 10 yards shuttle run.
3. Flexibility was measured by Sit and Reach test.
4. Balance was measured by stork stand test.

Findings

Table 1: Analysis of Co-variance of the means of bent knee sit ups test among two experimental groups and one control group

Mean	Gym	Medicine	Control	Source of Variance	SS	df	MSS	F-ratio
Pre-test	39.60	37.25	40.70	Among	124.23	2	62.12	1.13
				Within	3128.75	57	54.89	
Post-test	45.10	41.75	42.70	Among	119.23	2	59.62	1.73
				Within	1960	57	34.38	
Adjusted	44.86	42.86	41.83	Among	94.99	2	47.50	2.87
Post-test				Within	926.21	56	16.54	

$F_{.05}$ (2, 57) = 3.15, $F_{.05}$ (2, 56) = 3.15 A = among means variance. W = within group variance

The Table 1 clearly revealed no significant differences in Bent Knee Sit ups Test among two experimental groups (Group-A i.e., Gym Ball Group and Group-B i.e., Medicine Ball Group) and one Control Group i.e., Group-C in pre-, post- and adjusted post-test phases at 0.05 level of significant (F=1.13, 1.1.73 and 2.87<3.15 respectively). It was evident that the Gym Ball Group is better than the Medicine Ball Group and Control Group.

Table 2: Analysis of Co-variance of the Means of 4 × 10 yards shuttle run test among two experimental groups and one control group

Mean	Gym	Medicine	Control	Source of Variance	SS	df	MSS	F-ratio
Pre-test	9.34	9.17	9.48	Among	0.98	2	0.49	2.58
				Within	10.78	57	0.19	
Post-test	9.49	9.24	9.42	Among	0.70	2	0.35	1.30
				Within	15.0	57	0.27	
Adjusted	9.48	9.37	9.30	Among	0.33	2 0.17	1.12	
Post-test				Within	8.32	56	0.15	

F.05 (2, 57) = 3.15, F.05 (2, 56) = 3.15 A = among means variance. W = within group variance

The Table-2 clearly revealed no significant differences in 4 × 10 yards Shuttle Run Test among two experimental groups (Group-A i.e., Gym Ball Group and Group-B i.e., Medicine Ball Group) and one Control group i.e. Group-C in pre-, post- and adjusted post-test phases at 0.05 level of significant (F=2.58, 1.30 and 1.12<3.15 respectively). It was evident that the Gym Ball group is better than the Medicine Ball group and Control group.

Table 3: Analysis of co-variance of the means of sit and reach test among two experimental groups and one control group

Mean	Gym	Medicine	Control	Source of Variance	SS	df	MSS	F-ratio
Pre-test	16.83	17.65	16.92	Among	8.15	2	4.08	1.10
				Within	212.13	57	3.72	
Post-test	17.67	18.34	17.24	Among	12.30	2	6.15	1.83
				Within	192.0	57	3.37	
Adjusted	17.94	17.89	17.43	Among	3.16	2	1.58	2.71
Post-test				Within	32.59	56	0.58	

$F_{.05}$ (2, 57) = 3.15, $F_{.05}$ (2, 56) = 3.15 A = among means variance. W = within group variance

The Table 3 clearly revealed no significant differences in Sit and Reach Test among two experimental groups (Group A i.e., Gym Ball Group and Group-B i.e., Medicine Ball Group) and one Control Group i.e., Group-C in pre-, post- and adjusted post-test phases at 0.05 level of significant (F=1.10, 1.83 and 2.71 < 3.15 respectively). It was evident that the Gym Ball Group is better than the Medicine Ball Group and Control Group.

Table 4: Analysis of co-variance of the means of stork stand test among two experimental groups and one control group

Mean	Gym	Medicine	Control	Source of Variance	SS	df	MSS	F-ratio
Pre-test	19.99	21.30	16.01	Among	304.21	2	152.11	0.46
				Within	18968.57	57	332.78	

Post-test	36.69	36.98	23.79	Among	2269.12	2	1134.56	2.32
				Within	27843.0	57	488.47	
Adjusted	35.95	35.15	26.35	Among	1120.45	2	560.23	2.11
Post-test				Within	14867.53	56	265.49	

$F_{.05}$ (2, 57) = 3.15, $F_{.05}$ (2, 56) = 3.15 A = among means variance. W = within group variance

The Table 4 clearly revealed no significant differences in Stork Stand Test among two experimental groups (Group-A i.e., Gym Ball Group and Group-B i.e., Medicine Ball Group) and one Control group i.e., Group-C in pre-, post- and adjusted post-test phases at 0.05 level of significant (F=0.46, 2.32 and 2.11 < 3.15 respectively). It was evident that the Gym Ball group is better than the Medicine Ball group and Control group.

Discussion of findings

Gathering pretreatment and post treatment results and its subsequent statistical calculation employing the statistics of Analysis of Co-variance (ANCOVA) revealed that there was insignificant difference in the development of Motor Fitness through the exercises of Gym ball and Medicine ball. The Motor Fitness component selected under the study were- Core Strength (Abdominal Strength), Agility, Flexibility and Balance. The effect of Gym balls is their ability to provide an unstable surface to exerciser. Gym ball help to increase balance, increase the strength of the core region (Warpeha, 2004) [4].

The medicine balls also have been used historically for training upper and lower body muscles as well as core muscles (Faigenbaum *et al*., 2007) [6] medicine balls have been used in a variety of populations including resistance training in school-aged boys (Faigenbaum *et al*., 2007 and Cocrane and Hawke, 2007) [6, 5], to increase the motor abilities and fitness and fitness in obese children (Korsten, 2007) [3]. The exercises chosen for both Gym ball and Medicine ball were found to have some similarity in movement execution and activating of the same muscle group. The doses of exercises were also found similar. That's there was probability of getting insignificant difference of Motor Fitness development between the two types of training among two experimental groups i.e. Gym Ball Group and Medicine Ball Group. Thus, the null hypothesis of no difference in developing Motor Fitness through the two types of training was accepted. Further it was seen that there was a insignificant higher trend in improvement of Motor Fitness through Gym Ball Training than Medicine Ball Training. This result revealed that Gym Ball may be a new and interesting equipment for the subjects and they enjoy it while training with the same apparatus without filling bored and monotonous rather feeling a sense of fatigue.

Conclusion

On the basis of analysis of data and interpretation of results it was concluded that exercise training with Gym ball and medicine ball have showed positive improvement but no difference between both the training was found. Further it may concluded that both the ball training is beneficial for the development of motor fitness.

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