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Effect of yoga Pilates and combination of yoga and Pilates training on selected motor ability of college women

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Abstract

The study aimed at finding the effect of yoga and combination of yoga and pilates training on selected motor ability. Sample of the stud includes 60 college women from Calicut university ladies hostel. Stork balance stand test, sit up test, sit and reach test and flexed-arm hang test were used. The results indicate that Pilates group showed significant improvement on muscular endurance. The yoga group showed significant improvements on flexibility. The control group showed no significant improvement on four selected motor ability variables namely muscular endurance, muscular strength, flexibility and balance. Pilates, yoga, combination of yoga and Pilates groups have significant improvement of selected motor ability variables namely muscular strength, muscular endurance, flexibility and balance, when compared to the control group.

Keywords: Yoga Pilates, yoga, Pilates training, motor ability

Introduction

Physical activity offers a broad range of benefits, including the prevention of obesity, improved self-confidence and an overall sense of well-being. Physical education programs within the school setting can set the stage for how children view physical fitness, activity levels and future health. Physical education program also include general health and safety information in addition to providing opportunities for player to learn how to cooperate with one other in a team setting.

Pilates is a physical fitness system developed in the early 20th century by the Greek German born Joseph Pilates. Joseph Pilates accompanied his method with a variety of equipment he referred to as apparatus. The Apparatus was designed to help accelerate the process of stretching, strengthening, body alignment and increased core strength started by the mat work. The best-known and most popular piece today, the Reformer, was originally called the Universal Reformer, aptly named for universally reforming the body. Eventually a full complement of equipment and accessories was designed by Pilates, including the Cadillac, Wanda Chair, High Electric Chair, Spine Corrector, Ladder Barrel and Pedi-Pole. In common with early twentieth century physical culture, Pilates had an extremely high regard for the Greeks and the physical prowess demonstrated in their Gymnasium.

Students are taught to use their powerhouse throughout life's daily activities. According to Joseph Pilates, the powerhouse is the centre of the body and if strengthened, it offers a solid foundation for any movement. This power engine is a muscular network which provides control over the body and comprises all the front, lateral and back muscles found between the upper inner thighs and arm pits.

The Powerhouse is activated effectively by hollowing of the deep abdominals, by drawing the navel back into the spine in a zipping-up motion, from the pubic bone to the breast bone thereby engaging the heels, the back of the inner thighs, the deep, lower-back muscles, and the muscles surrounding the sitting bones and tailbone area without inhibiting the natural function of the diaphragm that is without the practitioner holding their breath either from lifting the chest upwards or contracting the chest.

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In the sitting position the power engine elevates the torso and places the center of gravity at its highest and most efficient position in prone position it elongates the body bidirectional to reduce weight in the upper body; in supine position it elongates the body bidirectional and places the center of gravity again at its highest and most efficient position.

Yoga is a form of mind-body fitness that involves a combination of muscular activity and an internally directed mindful focus on awareness of the self, the breath, and energy. Four basic principles underlie the teachings and practices of yoga's healing system. The first principle is the human body is a holistic entity comprised of various interrelated dimensions inseparable from one another and the health or illness of any one dimension affects the other dimensions. The second principle is individuals and their needs are unique and therefore must be approached in a way that acknowledges this individuality and their practice must be tailored accordingly. The third principle is yoga is self-empowering; the student is his or her own healer. Yoga engages the student in the healing process by playing an active role in their journey toward health, the healing comes from within, instead of from an outside source and a greater sense of autonomy is achieved. The fourth principle is that the quality and state of an individual's mind is crucial to healing. When the individual has a positive mind-state healing happens more quickly, whereas if the mind state is negative, healing may be prolonged.

Physical, mental, intellectual and emotional develop in a harmonious and integrated fashion to meet the all round challenges at the modern technical era, with its hectic speed. The speciality of the yogic process is that the faculties get sharpened in tune with the spiritual progress of man. One can practice yoga for all sorts of reasons to remain fit; to stay healthy or recover the health; to balance the nervous system; to calm the busy mind and live in a more meaningful way.

Motor ability is present acquired and innate ability to perform motor skills of a general or fundamental nature, exclusively of highly specialized sports or gymnastics techniques. Include several items such as strength, endurance, flexibility, balance and power and these traits plays major role in enhancing the performance of any activity. With a good and well efficient combination of all these motor performance traits a player can give all his/her utmost throughout the most strenuous of competitive matches. Motor fitness is to be measured by performance and this performance is based on composition of many factors. The most commonly mentioned factors are power, speed, agility, strength, endurance, balance and flexibility. Some of these factors evidently are more dominant than others and thus have relation with motor fitness. Abilities are genetically predetermined characteristics that affect movement performance such as agility, coordination, strength, and flexibility. Abilities are enduring and as such, difficult to change in adults. Abilities differ from skills in the sense that skills are learned, whereas abilities are a product of both learning and genetic factors.

Hypotheses

1. It was hypothesised that the Pilates practise provides significant improvement on muscular strength and balance.
2. It was hypothesised that there would be a significant improvement to the flexibility due to yoga practice.

Delimitations

The study was delimited to a total of 60 college women randomly selected from the ladies hostel in Calicut university campus. Their age group ranged between 20 and 25 years. The training program used in this study was delimited to 5 day a week for 6 weeks. The study was further delimited to selected yoga asana and selected pranayamas. The study was delimited to selected Pilates exercise emphasising various joints. The selected motor ability components namely flexibility, balance and muscular endurance and muscular strength were included.

Limitations

The difference that exists among the subjects due to varied social cultural and economic factors cannot be controlled and this considered as a limitation of this study. Diet and daily routines of the subjects are not taken in to consideration.

Methodology

The present study is an experimental study which adopted random group design.

Sample

The study was designed to analyse the effect of yoga Pilates and combination of yoga and pilates training on selected motor ability components of college women. To achieve the purpose of the study, the research scholar randomly selected 60 college women from Calicut university ladies hostel and they were divided in to four groups of 15 each as experimental group I (yoga group), experimental group II (Pilates group), experimental group III (combination of pilates and yoga) and control group. Their age ranged between 20 and 25 years.

Tools

Stork Balance Stand Test is used to assess the ability to balance on the ball of the foot. Sit Up test measured the endurance of the abdominal and hip-flexor muscles. The sit and reach test is an important functional measure of hip region flexibility, including the lower back and hamstring muscles (the back of the legs). Flexed-Arm Hang Test measured upper body strength and endurance by timing how long they can hang with the chin above the bar.

Procedure

The training program was conducted at the Calicut University ladies hostel. The program was conducted on regular basis in morning session and evening session for five days in a week for a period of six weeks. The training program started with light stretching and the duration of first week started with 40 minutes and at the last week of training program ends with duration of 1 hour. During the time of training relational yoga exercises like Sooryanamaskar, Makarasan, Bhujangasan, Dhanurasan, Salabhasan, Vsramasan, Paschimothasan, Januseershasan, Ardha malsyadrasan, Vipareethakirani, Sarvangasan, and at last Savasan and also specified Pilates exercises.

The experimental design used in the study was random group design in which 60 female students were divided in to four groups of fifteen each. The experimental group I undergo yoga in a schedule of weekly five days in 1 hour and experimental group II under gone Pilates in a schedule of weekly five days in 1 hour, experimental group III under gone yoga and pilates on alternative weeks for periods of six weeks and control group were not given any special training. The training period for this study was six weeks.

Results

Table 1: Post test and pre-test of flexibility based on control group and experimental groups

Group	test	N	Range	Minimum	Maximum	Mean	Std. Deviation
Yoga	Pre	15	13.00	4.00	17.00	10.1333	3.70071
	Post	15	2.00	15.00	17.00	15.6000	.91026
Pilates	Pre	15	8.00	5.00	13.00	9.5333	2.29492
	Post	15	8.00	8.00	16.00	11.2000	2.56905
Combined	Pre	15	13.00	3.00	16.00	10.1333	4.03320
	Post	15	13.00	3.00	16.00	10.1333	4.03320
Control	Pre	15	13.00	2.00	15.00	9.9333	3.84460
	Post	15	11.00	3.00	14.00	10.3333	2.82000

It was observed from the table 1 that mean value of pre-test on flexibility was 10.13, 9.53, 10.13, 9.93 and in case of the mean value of post test for flexibility was 15.60, 11.20, 10.13

and 10.33 for yoga group, Pilates group, combined group and central group respectively.

Table 2: Post test and pre-test of muscular endurance based on control group and experimental groups.

Group	test	N	Range	Minimum	Maximum	Mean	Std. Deviation
Yoga	Pre	15	31.00	9.00	40.00	26.7333	9.23864
	Post	15	27.00	15.00	42.00	28.0000	8.29802
Pilates	Pre	15	28.00	10.00	38.00	27.0667	8.69702
	Post	15	20.00	18.00	38.00	32.3333	5.32738
Combined	Pre	15	26.00	13.00	39.00	27.2667	8.68880
	Post	15	25.00	15.00	40.00	29.3333	7.41299
Control	Pre	15	32.00	10.00	42.00	26.8667	9.67963
	Post	15	31.00	9.00	40.00	26.7333	9.23864

It was observed from the table 2 that the mean value of perfect for muscular endurance was 26.73, 27.06, 26.86 and in case of post mean value of post test for balance was 28.00,

32.33, 29.33 and 26.73 for yoga group, Pilates group, combined group and central group respectively.

Table 3: Post test and pre-test of balance based on control group and experimental groups.

Group	test	N	Range	Minimum	Maximum	Mean	Std. Deviation
Yoga	Pre	15	29.00	17.00	46.00	33.7333	9.45264
	Post	15	25.00	25.00	50.00	36.7333	8.10173
Pilates	Pre	15	29.00	18.00	47.00	34.0667	9.88120
	Post	15	25.00	22.00	47.00	36.0667	8.42163
Combined	Pre	15	44.00	3.00	47.00	31.6000	11.94511
	Post	15	27.00	25.00	52.00	36.2667	8.15446
Control	Pre	15	30.00	18.00	48.00	33.4000	9.24121
	Post	15	27.00	19.00	46.00	34.4000	9.29516

It was observed from the table 3 that the mean value of present far balance was 33.73, 34.06, 31.60 and 33.40 in case of post test mean value was 36.73, 36.06, 36.26, and 34.40 far

yoga group' Pilates group, combined group and central group respectively.

Table 4: Post test and pre-test of muscular strength based on control group and experimental groups.

Group	test	N	Range	Minimum	Maximum	Mean	Std. Deviation
Yoga	Pre	15	12.00	3.00	15.00	8.8000	3.12136
	Post	15	13.00	3.00	16.00	9.3333	3.33095
Pilates	Pre	15	15.00	2.00	17.00	8.9333	3.65409
	Post	15	12.00	8.00	20.00	11.1333	3.22638
Combined	Pre	15	12.00	3.00	15.00	8.8000	3.42679
	Post	15	11.00	5.00	16.00	10.2000	3.09839
Control	Pre	15	13.00	2.00	15.00	8.1333	3.71996
	Post	15	11.00	3.00	14.00	8.7333	2.98727

It was observed from the table 4 that the mean value of pre test for muscular strength was 8.80, 8.93, 8.80, 8.13 and in case of the mean value of post test for muscular strength was

9.33, 11.13, 10.20, and 8.73 for yoga group' Pilates group' combined group and central group respectively.

Table 5: Analysis of co-variance done among the four groups on muscular endurance

Source	df	SSx	Ssy	Ssxy	Ssyx	MSSyx	F Ratio (yx)
Between	3.00	2.45	259.80	13.30	240.65	80.22	7.93*
Within	55.00	4622.53	3325.60	3577.80	556.41	10.12	

Analysis of co variance done on muscular endurance indicates a significant F-ratio, as the calculated F-value of 7.93 is greater than the tabulated f value of 2.77, required for significance at 0.05 levels. Hence, in order to find out the most effective training programme and also to explore

whether any significant difference existed among the final means of experimental and control groups, the LSD post hoc test was applied for pair wise comparison analysis on adjusted means of the post test data and the results are presented in the Table 6.

Table 6: The post hoc test for the between the post test means on muscular endurance

Yoga	Pilates	Combined	Control	Mean diff.	CD (5% level)
28.19	32.27			4.08*	2.49
28.19		29.11		0.92	2.49
28.19			26.82	1.37	2.49
	32.27	29.11		3.15*	2.49
	32.27		26.82	5.45*	2.49
		29.11	26.82	2.29	2.49

Table 6 of LSD post hoc test on muscular endurance for difference in paired final means among the different experimental and control groups indicates significant values of 4.08 between yoga and Pilates group, 3.15 between Pilates group and combination group as those values were much higher than 2.49, the critical difference needed to be significant at 0.05 level of confidence. On the other hand, no

significant differences have been found between yoga combination group, yoga and control, combination and control group as the mean difference were 0.92, 1.37 and 2.29 respectively. This does mean that all the experimental groups namely yoga, Pilates and combination groups are equally effective on selected motor ability components.

Table 7: Analysis of co variance done among the four groups on balance

Source	df	SSx	Ssy	Ssxy	Ssyx	MSSyx	F Ratio (yx)
Between	3.00	54.53	46.53	-4.47	84.57	28.19	2.26
Within	55.00	5811.07	4052.40	4423.07	685.80	12.47	

The above table related to the analysis of co- variance done among the different groups on balance do indicates, the f-ratio is 2.26 which were much less than the tabulated f value of

2.73, since the f-ratio found to be insignificant, the post hoc test was not done.

Table 8: Analysis of co-variance done among the four groups on flexibility

Source	Df	SSx	Ssy	Ssxy	Ssyx	MSSyx	F Ratio (yx)
Between	3.00	3.60	295.92	10.00	288.38	96.13	15.98*
Within	55.00	700.13	443.07	280.27	330.87	6.02	

Analysis of covariance done on flexibility indicates a significant f-ratio, as the calculated f value of 15.98 is greater than the tabulated f value of 2.77, required for significance at 0.05 level. Hence, in order to find out the most effective training programme and also to explore whether any

significant differences existed among the final means of experimental and control groups, the LSD post hoc test was applied for pair wise comparison analysis on final means of the post test data and the results are presented in the table 9.

Table 9: The post hoc test for the between the post test means on flexibility

Yoga	Pilates	Combined	Control	Mean diff.	CD (5% level)
15.52	11.36			4.16*	1.92
15.52		10.05		5.47*	1.92
15.52			10.33	5.19*	1.92
	11.36	10.05		1.31	1.92
	11.36		10.33	1.03	1.92
		10.05	10.33	0.28	1.92

LSD post hoc test on flexibility for difference in pairs final means among the different experimental and control groups indicates significant values of 5.47 between yoga and combined group, 5.19 between yoga and control group and 4.16 between yoga and Pilates as their values were much higher than 1.35, the critical difference needed to be significant at 0.05 level of confidence. On the other hand no significant difference have been found between Pilates and

combined, Pilates and control and combined and control group as the mean difference were 1.31, 1.03 and 0.28 respectively, which were much lower than 1.92, the critical difference required to be significant at 0.05 level. This does mean that yoga group was effective to increase the flexibility significant mean differences were found among the different group and hence yoga group programme can be used to reduce the flexibility.

Table 10: Analysis of co-variance done among the four groups on muscular strength

Source	df	SSx	Ssy	Ssxy	Ssyx	MSSyx	F Ratio (yx)
Between	3.00	5.87	49.25	13.73	34.84	11.61	1.99
Within	55.00	681.47	560.40	405.27	319.39	5.81	

The above table related to the analysis of co variance done among the different groups on muscular strength do indicates, the f-ratio is 1.99, which were much less than the tabulated f-value of 2.73. Since the f-ratio found to be insignificant, the post hoc test was not done.

Discussion

The study hypothesised that there would be a significant improvement on selected motor ability components due to the practise of yoga and pilates. The results of the study revealed that there was a significant improvement on selected motor ability components namely muscular strength and balance. This improvement was due to the effect of six weeks practising pilates. Hence the first hypothesis of the research scholar was accepted at 0.05 level of confidence. In the second hypothesis, it was mentioned that there would be a significant improvement to flexibility due to the practise of yoga. Results of the study revealed that there was a significant improvement to the flexibility due to six weeks of yoga and training program. Hence the researcher's second hypothesis was accepted at 0.05 level of confidence.

Conclusions

Based on the result of the study the following conclusions were drawn:

- The Pilates group showed significant improvement on muscular endurance.
- The yoga group showed significant improvements on flexibility.
- The control group showed no significant improvement on four selected motor ability variables namely muscular endurance, muscular strength, flexibility and balance.
- Pilates, yoga, combination of yoga and Pilates groups have significant improvement of selected motor ability variables namely muscular strength, muscular endurance, flexibility and balance, when compared to the control group.

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