

Suryanamaskara - Innovative Work Site health Promotion program for Traffic Police

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Abstract: In the 21st century it is more important to prevent people from becoming sick. In this study to promote occupational health of traffic police, we hypothesized Suryanamaskara to bring changes in muscle power, flexibility and endurance. 30 apparently healthy Traffic Police were selected for 8 weeks of Suryanamaskara workshop. Test battery used to evaluate muscles power, flexibility and endurance at starting and at end of the workshop. Statistical analysis using Paired T- test showed significant improvement in all parameters. For clinical applicability effect size formula was applied. Flexibility showed large practical significance. Suryanamaskara can be considered as an integral part in work site health promotion program of Traffic policeman to excel their occupational health.

Key Words - Work site health promotion program, Traffic Police, Suryanamaskara.

1 Introduction

Modern lifestyle, which includes stress, physical inactivity, imbalance diet and lack of time to perform exercises increases susceptibility for many diseases. Driscoll et al. says that traffic police officers job is high risk. They are susceptible for many occupational related health problems.¹ Previous studies done on traffic policeman showed affection of strength and endurance.² Average fat percentage on higher side, mean BMI 26.18 on obese side and altered lumbar curve angle with android type of obesity.³ Quality of life survey using WHOQOL-BREF concludes as physical environment is one of the most affected component.⁴ Associated psychosocial problems and work related musculoskeletal symptoms coexist.^{5,6} All this demands strong occupational health promotional measure need to be taken for this community.

Suryanamaskar apart from improving one's posture, also gives a proper workout to the body and helps losing the unwanted flab.⁷ According to certain studies, Suryanamaskara is effective in increasing hamstring flexibility and improving upper body muscle endurance.^{8,9} Madan singh rathore suggested that Suryanamaskar may be recommended to improve muscular endurance and flexibility among college level girls.¹⁰ Thus the present study was designed to evaluate Suryanamaskara as work site health promotion program for Traffic Police.

2 Methodology

30 apparently healthy Traffic Police were selected for 8 weeks of surynamaskara workshop. Recent fracture of upper or lower limb, Individual with chronic diagnosed disease and on treatment excluded from study. After selection Demographic details like weight, height, waist circumference and fat percentage were noted. Assessment done with test battery to evaluate muscles power (Vertical jump test), flexibility (Sit and Reach test) and endurance (1 minute



Push up & 1 minute Sit up test) at starting and at end of the workshop.

2.1 Protocol

Each subject was informed about the purpose of the study and a written consent was taken. Pre assessment was taken with help of specially designed battery of test and pre validated questionnaire. The numbers of Suryanamaskaras were gradually increased from 2sets in the 1st week to 25sets in the 8th week. The subjects were re assessed after completing 8weeks of Suryanamaskara. Exercise was supervised by a therapist. Compliance was considered as successfully completing >80% of exercise sessions.

3 Results

Table 1: Age distribution in Suryanamaskara Participants

Age(years) of the subjects	Number of Subjects
21-30	3
31-40	14
41-50	10
51-60	3

Table 2: Effect on Flexibility of the body

Distance in centimeter	Pre Suryanamaskara	Post Suryanamaskara
Mean	24.25	31.13
Standard Deviation	6.912	7.338
Two tailed P value	0.0094	Extremely Significant
Effect size	0.99 = Large practical significance	

Table 3: Distance in Vertical Jump Test

Distance in centimeter	Pre Suryanamaskara	Post Suryanamaskara
Mean	32.33	36.27
Standard Deviation	7.089	8.63
Two tailed P value	0.007	Very Significant
Effect size	0.6 = Moderate practical significance	

Table 4: Lower limb Muscle Power – Vertical Jump Test

Power in watts	Pre Surynamaskara	Post Surynamaskara
Mean	553.26	602.55
Standard Deviation	133.09	151.83
Two tailed P value	0.0094	Very significant
Effect size	0.4 = Small practical significance	

Table 5: Endurance of abdominal muscle – 1 Min. Curl up test

Repetitions in 1 minute	Pre Surynamaskara	Post Surynamaskara
Mean	32.067	33.90
Standard Deviation	10.80	10.47
Two tailed P value	0.0064	Very Significant
Effect size	0.2 = Small practical significance	

Table 6: Endurance of upper limb and chest muscle – Push Up test

Repetitions in 1 minute	Pre Surynamaskara	Post Surynamaskara
Mean	41.167	42.667
Standard Deviation	12.34	11.92
Two tailed P value	<0.0001	Extremely Significant
Effect size	0.1 = No practical significance	

Table 7: Fat percentage

Fat percentage (%)	Pre Surynamaskara	Post Surynamaskara
Mean	25.947	24.667
Standard Deviation	2.835	2.272
Two tailed P value	0.0039	Extremely significant.
Effect size	0.5 = Moderate practical significance	

Table 8: Weight Difference

Weight in Kg.	Pre Surynamaskara	Post Surynamaskara
Mean	79.083	76.867
Standard Deviation	7.744	7.445
Two tailed P value	<0.0001	Extremely Significant
Effect size	0.3 = Small practical significance	

Table 9: Difference in BMI



Weight in Kg.	Pre Suryanamaskara	Post Suryanamaskara
Mean	25.76	25.04
Standard Deviation	2.561	2.496
Two tailed P value	<0.0001	Extremely Significant
Effect size	0.3 = Small practical significance	

4 Discussions

Suryanamaskara workshop was held for 8 weeks continuously on alternate days. As seen in table 1, major portion of subjects were Middle aged. Ruling out age related deterioration of health as well as disease related pathophysiology on results.

The improvement in flexibility, demonstrated in table 2, can be attributed to the dynamic postures assumed by the subjects while performing Suryanamaskara. Suryanamaskara helps in increasing flexibility as it stretches the hip and spine muscles, arms & neck extensors. During forward bending, the pelvis rotates anteriorly and the erector spine, gluteus maximus and hamstrings muscles gets stretched. Poses of Suryanamaskara, demanded movement till the end range of motion which would be the reason of noteworthy change in flexibility. As seen in table 3 and 4, Moderate improvement seen in explosive muscle power of lower limb, assessed by Vertical Jump Test. This increase in muscle strength can be explained on the basis of stimulation of skeletal muscles during the isometric contraction maintained due to the steady state of the different postures in Suryanamaskara.

Curl ups count was improved because of the plank pose as in this pose there is static contraction at the core muscles and they also works against the gravity. (Table 5) While performing Suryanamaskara, the dynamic postures lead to stretch and contractions of muscles of entire body alternatively. Many of the poses build strength as it requires sustained contractions of muscle groups against the gravity; which is comparable to resistance training. There is weight bearing of Upper Limb, leads to strengthening of Upper Limb and trunk muscles. This justifies improvement seen in Push Up test, table 6. Negrete et.al (2010) confirmed that Minimal Detectable Change for both the push-up and modified pull-up was 2 repetitions. In Table 5 and 6, difference is around 2 repetitions, with 8 weeks of practice. Thus prolong practice of Suryanamaskara may show more significant change.

According to Holloszy (1984), Increase in mitochondrial size, number and mitochondrial enzymes is mediated by the repetitive contractile activity of the muscle. Also these adaptations are very specific to the type of muscle fibers recruited. Increase in muscle endurance would be because of the metabolic adaptations occurring with training are lower blood lactate levels which delays the development of fatigue and increased fat oxidation.

Suryanamaskara builds up strength of the body without any external aid only with the body's own weight as a resistance. If sets of Suryanamaskara are done in proper rate and rhythm in particular time it boost aerobic endurance.

Total body fat% lowered significantly with moderate practical significance. (Table 7) Lipids are major fuel source to the exercising muscles. This shows that Suryanamaskara triggers fat metabolism. NHLBI, (1998) reported in review, BMI provides a more accurate measure of total body fat than relying on weight alone. The research denotes that physical activity > 150 minutes/week usually results in modest weight loss (defined as ~2-3 kg). This

can justify change in weight and BMI in participant of Suryanamaskara workshop. (Table 8, 9) Duration of Suryanamaskara work shop was around more than or equal to 180 minutes. As per Forbes (1976) there is decline in muscle tissue by 4-6 lbs per decade and reduction of muscle efficiency.(Nair,2005) Because of this there is a drop in the resting metabolic rate and an increase in body fat. (Wolfe 2006, Kyle 2001, Mazariegos 1994) Astrup(2000) stated that 2-3% increase in resting metabolic rate, reverses age-related weight and fat gain. Suryanamaskara aerobic component improves metabolic functions, especially enzymes in the muscles whereas, resistance component improves muscle protein synthesis and hence muscle mass.

According to NHLBI, (1998) abdominal fat content should be assessed and followed by measuring waist circumference. Hip and waist circumferences showed statistically significant changes post Suryanamaskara. However practical significance was very low. Active contraction of muscles around hip, leads to toning of glutei muscle.

Thus Suryanamaskara turn out to be effective on site fitness program for health promotion of Traffic police.

5 Conclusions

It can be concluded that work site health promotion program, Suryanamaskara is economical as it doesn't require costly instruments, in turn maintenances and space requirements saved. Another advantage is time factor. It provides complete provision of fitness enhancement, including flexibility. Thus over time, Suryanamaskara if practiced regularly the occupational health of traffic policeman can be improved and will help to achieve a sense of well-being.

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