Section I

Introduction
1. Introduction

The word ‘Yoga’ means unity or oneness and is derived from the Sanskrit word ‘Yuj’ which means to join, to bind, to attach or to unite. In a practical sense Yoga is a means of balancing and harmonizing the body, mind and emotions (217). This is achieved through the practice of Asana, Pranayama, Mudra, Bandha, and Meditation (195). Asana is spoken of as the first part of yogenic practice (233). The famous Indian sage Patanjali, propounder of Yogasutras (Rules of Yogenic disciplines) defined Asana as “Sthiram sukham aasanam” i.e. the position that is comfortable and steady is known as Asana (190).

There are various forms of asanas like backward bending, forward bending, spinal twisting, inverted balancing and standing asanas. Surya Namaskar is a kind of Yogenic asanas involving forward bending, backward bending and standing postures.

It is claimed by Yogenic text that practicing Surya Namaskar is an effective way of loosening up stretching, massaging and toning up of all the joints, muscles and internal organs of the body (192).

The ‘Surya Namaskar’ is derived from two words ‘Surya’ means ‘the Sun’ and ‘Namaskar’ means ‘obeisance’. Yoga scriptures tell that the sun is represented by Pingla or Surya nadi, the pranic channel that carries the vital life giving force (192). In a Yogenic sense Surya Namaskar is an asana consisting of several postures of the body performed in a particular way. According to Yogenic text this dynamic group of Yogenic asanas is not being considered as a traditional form of Hatha Yogenic Practices as it was developed in the much later period in the evolution of various Hatha Yogenic asanas.

The Sun is the ultimate source of all kinds of energy. Without the sun the existence of life would not have been possible on this planet earth. Ancient Indian sages, Yogis and Philosophers realised the tremendous potential of the sun and they started worshipping it. This was the very basis of the initial development of Surya Namaskar.

In Veda, Ramayana and Suryopanishad the sun has occupied a very key position (187). In ancient architectural structures of India we find the sun worshipping. The Aztec, Inca, and Mayan civilisations all had temples dedicated to the solar gods. Thus it is seen that
from time immemorial the sun has caused a great impact on day to day human life and civilisation. With the passage of time the sun worshipping in various forms has lost its significance. But the popularity of practicing *Surya Namaskar* has gained momentum as a means of achieving physical fitness throughout the world in spite of prevailing various other forms of conventional physical exercises.

*Surya Namaskar* generally consists of twelve different postures performed rhythmically and simultaneously with controlled breathing. In some yoga scriptures we find the mention of sixteen postures also for performing one complete round of *Surya Namaskar*. The ideal time to practice *Surya Namaskar* is at sunrise. If it is not possible to practice in the morning it can be done at any convenient time of the day provided the stomach is empty (189,191). The time duration for practicing one complete round of *Surya Namaskar* and the number of rounds performed at a time is controversial. In general, every posture is performed very slowly while one started practicing *Surya Namaskar* and gradually it is practiced in a faster way when one has adopted the practice completely. Thus for practicing one round the time may vary from 5-6 minutes (at the beginning) to 1-2 minutes (at an advanced level of practice). Regarding the number of rounds to be practiced at a time, Yoga literatures suggest that beginners can start off with 2-3 rounds then go on increasing the rounds up to 12. Advanced practitioners can practice 24 to 54 rounds daily depending on their level of practice (189,191).

Various studies have been conducted to study the different physiological systems individually during yogic practice (2-3,13,228,262) and longitudinally at different time intervals to observe the training effects (84,140,170-171,184,211,255,256). Some of the yogic asanas have also been studied in detail (27-29,161-163,170-172). But the detailed scientific study on *Surya Namaskar* is still lacking. With the aim to evaluate critically the physiological changes during the actual practice of *Surya Namaskar* with a special emphasis on energy cost and cardio-respiratory changes, the present study was proposed. It was also aimed to study the Yoga trainees longitudinally on different phases of the training throughout the year.

Similar recordings were also taken on advanced Yoga practitioners (Yoga Proficient and Yoga Semi-Proficient subjects those who are practicing yoga for more than four years) and compared with the yoga trainees in the present study.