

CHAPTER 7.0

7.0 DISCUSSION

7.1 PHYSICAL FACTORS

The results of the energy level measurements showed there were significant differences after 3 months of regular YN and *yoga* practices compared to control group. Further, these values were all in optimal energy level, regardless of the changes in external conditions (e.g., low temperature, academic exams). In the follow-up, the score of HEF, heart and lung were significantly lower in YN group compare to control group; the score of HEF, HS, ER, heart, lung and kidney showed significantly lower values in *yoga* group compare to control group. The findings of energy level from this study also showed there were no significant differences after intervention and follow-up between YN group and *yoga* group. Physical factors had similar results for YN and *yoga* groups indicating that either one could be effective.

All the physical factors in three groups showed a significant decrease after intervention and follow-up (except kidney score in control group) compared to baseline. It is noted that ER in YN and *yoga* group showed a significant decrease from hyperactive energy level to a normal range of optimal health compared to baseline. Data obtained from Bio-Well found that the values of overall physical energy parameters (HEF, HS, ER) were relatively stable in the YN and *yoga* group, whereas the control group exhibited a large decrease after the third month of intervention. The energy level of the five major emotion-related organs showed optimal homeostasis in YN and *yoga* group, whereas the control group was having all below normal range values, which indicated lower homeostasis levels in the body and its emotion-related organs.

Furthermore, the results of entropy level showed no significant differences in the three groups at all time points. The entropy level showed significant changes in three groups after intervention compared to baseline. The findings of entropy level after 3 months intervention were positively reduced compared to baseline, showing clearly that practice of ethical disciplines of *yama* and *niyama* over a duration of time not only reduced the disarray in the body energy system but also improved regulation of the emotions in a profound way. The improvements in emotions were also noticed in the personal reports the participants shared with the researcher at the end of the program. However, it is seen that after intervention, the ER value in the control group was below normal range. The above result of decreased entropy is possible when the energy itself is largely decreased

in the body. Normal health is achieved only when both entropy and energy are within normal ranges. Normal entropy is likely to reduce the requirement of excess energy; only long term follow-up could make this clear (Korotkov, 2014).

Earlier studies have shown *yoga* as helpful in mind-body development and as an effective self-care skill for emotional regulation (Schure et al., 2008; Gard et al, 2014; Roche et al., 2017). The researchers suggest that the mechanism behind these observations may be ascribed to *yoga* practices that affect the autonomic nervous system (Pascoe & Bauer, 2015), which leads to balance and regulate the functioning of sympathetic and parasympathetic nervous systems; therefore, any abnormal flow of bioenergy may further be reduced and corrected. This argument might be supported through improved optimum size and uniformity of the bio-gram glow area after *yoga* practices (Narayanan, 2014). Another study reported the parameter for detecting stress reaction, namely alpha-amylase decreased with concomitant increase in glow area homogeneity in EPI images (Hacker et al., 2007). *Yama* and *niyama* practices may share similar mechanisms of balancing the function of autonomic nervous system.

Traditional Chinese Medicine views seven emotions are closely associated with corresponding five primary organs: joy links with the heart, anger with the liver, pensiveness with the spleen, worry and sadness with the lung, and fear and shock with the kidney (Dale, 2009). In other words, the influence of excessive emotions consumes energy and leads to damage of the related visceral organs, eventually causing health problems. For example, excessive anger reduces the liver energy; further, the flow of *qi* rises to the head resulting in headache, high blood pressure, and other symptoms. Recent experimental studies in neurosciences show emotions mapped on bodily locations (Damasio & Carvalho, 2013; Nummenmaa et al., 2013), especially linking points on the body that are involved in many kinds of cognitive and emotional functions. Surprisingly, it is also observed that the heart reflected all emotions, which is in line with the principles of TCM (Lee et al., 2017). These reliable evidences from Eastern and Western studies show that the human mind is strongly embodied.

The results of five major emotion-related organs agree with the previous findings that emotions affect our physiologic functions. The benefits of components of *yoga* including *āsana*, *prāṇāyāma* and meditation for physical and psychological health have been examined in a wide array of studies (Jeter et al., 2015; Field, 2016). In the current study, the physiological energy parameters of HEF, ER, HS, and the energy in the five major emotion-related organs also showed improved

levels which suggest that YN intervention improved energy regulation in the body. The better results observed in YN group may be attributed to the reduced fluctuation of emotions and improved spiritual factors, that resulting in improved life force circulation and harmony in physical functions, promoting positive health. This research demonstrates that the practice of ethics of *yoga* improves physiological energy changes which are consistent with the previous findings (Deo et al., 2015; Kushwah et al., 2015; Hegde et al., 2020).

7.2 PSYCHOSPIRITUAL FACTORS

We found that *yama-niyama* intervention resulted in significantly reduced stress level ($p < 0.001$, $d = 0.88$) after intervention compared to the control group. There was no significant difference between *yoga* group and control group, and *yoga* group and *yama-niyama* group. The within-group comparison showed the level of stress in YN group significantly decreased after intervention and follow-up compared to baseline. The finding demonstrated the feasibility and the value of practice of *yoga* ethical principles in the academic environment which given strength to the hypothesis that participation in the YN program significantly decreased stress. This study also provided initial results that practice of *yama-niyama* could be a self-care strategy among college groups. With regularity of practice over duration of time and set into the daily life, it can have a significant positive impact on stress reduction, even more, have a profound impact in an individual's present and future life.

Our findings agree with previous studies that the effects of separate limbs of *yoga* may decrease stress level (Sharma et al., 2013; Wheeler et al., 2017). Multiple studies, through different *yoga* approaches and durations, propose that the common biological mechanisms for *yoga* practice reduced the stress level by decreasing sympathetic activity and activating the parasympathetic activity (Arora et al., 2011; Tang, 2011; Riley & Park, 2015), and cortisol level mitigates through *yoga* practice in the context of stressors (Li & Goldsmith, 2012; Unger et al., 2016). Interestingly, Gard et al (2014) suggest the potential self-regulatory emotional mechanisms of the specific components of *yoga* practice, including ethical precepts seem to improve self-regulation by top-down regulatory processing associated with high-level brain networks (moral cognition network), while inhibiting emotional reactivity and negative appraisal. Moreover, previous evidence-based findings indicate the psychological mechanisms, that reduction in perceived stress improved in subjective well-being (quality of life and self-satisfaction), self-compassion, mindfulness, cognitive abilities (Gard T et al., 2012; Brems, 2015; Bond et al., 2013; Lemay et al., 2019). Although only limited literature on the ethics of *yoga* is available, we assume *yama-niyama*

practice may share similar mechanisms; the results of reduced the stress level may be associated with improved additional psychological well-being outcomes. We need further evaluation in future studies.

The stress and anxiety one often feels are because of violating *yama* and *niyama* (Adele, 2009). The source of stress among college students are mainly from the financial situation, health, love life, relationship with family and friends, academic performance and problems experienced by loved ones (Karyotaki et al., 2020). In this study, the systematic curriculum of *yoga* ethics may provide effective cognitive ability to cope with these stressors. We gave lectures and practical focus on the theme of *yama* and *niyama*. For example, we explain each discipline through lectures and review the points which were covered and discussed how to apply them into the varying circumstance of life. Especially, the mindful technique of *japa* writing (*Bhagavad Gītā*, XVI:1-3) along with daily introspection might rewire the brain and keep these spiritual principles at the forefront of the mind. This argument was based on the previous studies on emotion regulation related to moral development and neuroimaging on moral cognition (Eisenberg, 2000; Bzdok et al., 2012).

Participants following *yama* and *niyama* showed a significant difference in *sattva* score ($p < 0.001$, $d = 1.16$), *rajas* ($p = 0.003$, $d = 0.73$) and *tamas* ($p < 0.001$, $d = 1.10$) after intervention compared to control group. The *yama* and *niyama* group also showed a significant difference in *sattva* score ($p < 0.001$, $d = 0.81$), *rajas* ($p < 0.001$, $d = 0.85$) and *tamas* ($p = 0.043$, $d = 0.56$) after intervention compared to *yoga* group. In the follow-up, *yama* and *niyama* group showed a significant difference in the score of *sattva* compared to *yoga* group; and showed a significant difference in the score of *sattva* and *rajas* compared to control group. Further, *yama-niyama* group showed a significant increase in *sattva* after intervention and follow-up, whereas *rajas* and *tamas* showed a significant decrease after intervention and follow-up compared to baseline. There were no significant changes observed in the *yoga* and control group. According to the main theoretical framework of *Vedic Personality Inventory* (VPI) some of the qualities listed are considered psychological such as wrath, helplessness, depression, and intelligence; while some are considered spiritual, such as truthfulness, material detachment, and interest in spiritual understanding. Stempel et al. point out that “The combination of these attributes of an individual is considered to be a representation of one’s overall psychospiritual makeup, as well as an individual’s tendency to show specific psychological and spiritual tendencies and behaviors” (Stempel et al., 2006).

Several early studies found that *sattva* was positively associated with well-being, while *rajas* and *tamas* were negatively correlated (Khanna et al., 2013). Integrated *yoga* module has shown good effect on *sattva* scores as compared to physical exercise (Deshpande et al., 2008). Another study found that a 21-day *yoga* practice for college students increased *sattva* values while decreased *rajas* and *tamas* (Tikhe et al, 2012). These outcomes are in line with the present study, *yama-niyama* has shown to have a good effect on personality and psychospiritual growth. The component of *yoga* practice such as postures induces the body to relax, *prāṇāyāma* regulates the breathing rhythm, meditation, contemplative or introspection calms the mind may be the mechanisms that increase *sattva*, reducing *rajas* and *tamas* (Krishnan, 2006; Tikhe et al, 2012). *Yoga* ethics, for example, aids to cultivate the principle of non-violence, includes compassion and non-harmful behaviors toward all living being that can foster positive feelings of love and kindness. Similarly, other *yama* and *niyama* principles may aid in the development of self-awareness and positive attitudes, which may potentially have an effect on intrapersonal and interpersonal relationships, as well as enhance social connectedness (Ross et al., 2013; Kishida et al., 2019).

Cakrās were significantly better aligned ($p=0.003$, $d=0.74$) in YN group after intervention compared to control group. The results also revealed *cakrās* were significantly better aligned ($p=0.005$, $d=0.84$) in YN group after intervention compared to *yoga* group. In *yama-niyama* group, *cakrās* were significantly better aligned after intervention compared to baseline. The scattered distribution of the *cakrās* affects the body, mind, emotional and spiritual well-being. Usually, they are also affected by environmental factors and deviate to the left or right of the central line. Ideally, each *cakra* should be aligned along the spinal cord. The ideal balance of *cakrās* may be seen for people involved in daily meditation and mental training (Korotkov, 2017). Ethical training of *yama* and *niyama* significantly improved the balanced state of *cakrās*. The current study indicates the results of psychospiritual factors of YN intervention were interconnected. They are also in tune with the physical changes, and provide the evidence that emotion regulation reinforces the physical well-being. However, the *yoga* group had no significant changes in psychospiritual factors. This is likely due to the fact that *yama-niyama* practice in the *yoga* group is only touched upon for 10 minutes of total *yoga* practice of 45 minutes. The results of psychospiritual factors indicate that *yama-niyama* practices are more effective than mere *yoga* intervention. Thus for spiritual advancement, *yama-niyama* practices should be integrated along with *āsana* and *prāṇāyāma* practices. This is a significant finding and needs to be researched fully for establishing YN as important components of *yoga* practices.

Introspection is a beneficial practice; at the end of each class to mentally review the themes and the circumstances that one passed through is a great way to achieve this. Recall the particular aspects of spiritual living, and impress these spiritual principles in hearts and minds; this will rewire the brain and transform one into compassionate and caring person (Chidananda, 2016). Meditation and other contemplative activities have examined the impacts and mechanisms of the brain and central nervous system (CNS). According to contemporary psychological theories, activation of the *cakrās* can be viewed as a model of psychospiritual growth (Meadow, 1993). Modern science has observed contemplative practices in a mechanistic way, contemplative practices (e.g., mindfulness, compassion training, mantra repetition and introspection) as a common model of conscious self-regulation that integrate body-mind, activated neural structures, the parasympathetic nervous system and down-regulate sympathetic nervous system (Lazar et al., 2000; Tang et al., 2009; Weng et al., 2013). Contemplative practices mapped onto particular subtle body structures and functions explain that all mental activities are directed towards flow of energy in the subtle body. The *cakrās* are further balanced by repeated practise of concentrating energy and awareness (Loizzo, 2016). It is interesting to think about these mechanisms to determine how the introspection practice in the present study has an impact on the brain and CNS also.

A psychologist who has been following the growing interest in Eastern religion and spirituality in the West since the 1960s observed many people have followed spiritual practices for many years, but due to certain obstacles in their lives, their spiritual practice has failed to penetrate, without developing the most basic forms of self-care or interpersonal sensitivity (Welwood, 2002). It is something to introspect about; for a wholesome development path, this is where it starts: learn and practice moral and ethical behavior (Chidananda, 2016). These basic principles are essential to succeed in meditation to achieve the ultimate goal; they cause self-care and healthy holistic living. To verify our findings, *Patañjali's Yoga Sūtra* (1:33) states that *yoga* practice leads to personal transformation by fostering attitudes of friendliness toward those who are happy, sympathy for the unhappy, delight for the virtuous, and disregard for the evil. The mind becomes purified and calm when people adopt these attitudes (Yogananda & Kriyananda, 2013). This *sūtra* is in line with the theme identified in the current study that the ethical disciplines of *yoga* can lead to a transcendence of the ego and achieve a sense of connection to all humankind.

We summarize personal perspectives on the beneficial impact of *yama* and *niyama* practices on psychological changes and attitudes, based on findings from daily records and feedbacks from students and teachers. We quote some frequent comments from students of their experiences in

emotion and positive attitude such as: “*Yama* and *niyama* ethics made me a cheerful person...more compassion to all living beings.”; “I could introspect daily and this made me more satisfy with these moral values, they’re vital in my life.”; “...It is just like a panacea for me. *Yama* and *niyama* practices changed my life.”; “All the ethical disciplines are very special for me, it helped me understand about my inner energy and sources which can be used to replace negative thinking by positive thinking.” Improvements in self-awareness also made with comments such as: “Improved lot in my mental status...more peace and relax...improved concentration in the study, creative thinking, more self-discipline and as well as will power... I become more serious toward my life.” Some students mentioned cultivating a good relationship with family and friends such as: “I learned to pay attention and care for other people... I started to make new friends and connect with positive people.”; “I have better control of my anger now... The love of my family gives me more strength.” It’s worth noting that all these statements showed the positive impact of YN intervention, which is consistent with the aforesaid multiple *yoga* based-evidences.