



Immuno-Nourishing Early Cultures: Re-Evaluating Temple Rituals During Covid Pandemic

Dr Fresnal Das¹, Dr Anil Jose P S¹ & Dr Raju, S.²

¹Assistant Professor, Department of Psychology, Fatima Mata National College (Autonomous). ²Professor, Department of Psychology, University of Kerala

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ABSTRACT

People from different walks of life responded differently to coronavirus, with some completely unaware, while some lost their life. The pressing question in this context is, how humans, as a species, can be ready to combat pandemics like that of covid-19. That question as answered by many on a global scale, is, boosting the immunity of the people. This paper, with the help of scientific studies conducted in different locations by different researchers are used to evaluate a collective framework of such immune nourishing behaviours empirically, as it is appealed under Hindu customs. Research evidence from different fields of study with direct or indirect bearing on the study topic is considered; to understand whether there exists any support for the nurturance of a behavioural immune system. The Hindu temple and the ritualistic behaviors that happen amidst prayer was the foundation of the study. Absence of research evidence to yet say that prayer has any significant and direct health related benefits is considered, while the fact that no study has yet considered the effect of prayer on a holistic scale remains. Research evidence available is compiled and a step-by-step narrative, straight from the time period the devotee wakes up to the culmination of the prayer in the temple is provided. Some studies just focus on the nature of materials employed, while some, on the rituals or adapted forms of the same, while some, on the ambience alone.

Animals of varied forms, ranging from the nematode worms that are physiologically primitive to that of the neurologically sophisticated chimpanzees are found to be avoiding physical contact with specific things almost on a strategical level. This may happen even when a risk of infection is suspected (Goodall, 1986; Kiesecker, Skelly, Beard, & Preisser, 1999; Schulenburg & Müller, 2004). Similarly, humans have also been known to actively engage in a wide variety of behaviours that are protective against infections. Condom use and vaccination are prime examples of how humans are acting up on these behavioural tendencies in response to troubling conditions that we, as humans have been well acquainted with. The question that looms large is, how humans, as a species, are ready to combat pandemics like that of covid-19 which may not provide enough time to develop an effective vaccine with minimal side effect. The answer to that question as answered by many on a global scale, is boosting the immunity of the people. Several behaviours are the implicit outcome of social designing; and if carefully designed and presented, people can also be nudged to behave in ways that heighten their immune nourishing abilities even if unaware about the same.

This paper, with the help of scientific studies conducted in different locations by different researchers are used to evaluate a collective framework of such immune nourishing behaviours empirically, as it is

appealed under Hindu customs. Practices of a devout Hindu is supposed to be in adherence to a strict path of spatial-temporal and geographical practices or customs. These practices shrouded in a mystic blanket beseeching the blessings of the Gods. India, though considered the seat of knowledge since ancient times, followed birth right based knowledge dissemination. But care was taken to not let that refrain from using it for the benefit of the society. This was made possible by intercalating scientific knowledge into practice or religious systems that were supposed to bring good luck and health. All these practices were strengthened by the common stance of settlements popping up around temple structures and can be traced back to that of ancient Egyptians (Spencer, 2011) as well. There are many who vouch that Hinduism is not exactly a religion per se, but rather it is a way to lead one's life to its quintessence. Such practitioners and believers who vouch for the application level of the Hindu way of life, rely heavily on the attributed impact that the system has on the wellbeing of the individual practitioner. Though the belief systems and practices tend to vary in relation to the deity or the system that they are a part of, common factors can be observed across these practices; and form the foundational basis, this paper evaluates. The skeptical observation of such common practices when evaluated on the basis of empirically tested and verified research findings across multiple studies can be narrated in relation to behavioural immune system (Schaller & Park, 2011) and its nurturance.

The design of the entire social ecosystem around a religious institution or place of worship made the creation as well as the continued nurturing of the behavioural immune system into a well-oiled social system. Among the religions with most followers, Hinduism is void of a founding father or major proponent, rather the authority rests upon a large body of sacred texts that provide rules governing rituals, worship, pilgrimage, and daily activities, among many other things; which has further fringed to form a way of life – and at the center of this way of life is the temple and its associated rituals. Like all that is closely tangled with everyday life of commoners, there are many versions in existence for the reasons attributed to various rituals or traditions. Earth's dense magnetic wave path, was the location of choice for the erection of a temple though, how the energy quotient was measured, nor the validity of such a claim if it exists, is not known. But in the Vedas, the likes of modern-day Magnetic confinement fusion theory were referred to exist (Ferguson, 2015). References about magnetism are made in 52 verses, ranging all the way from how poles repel (Rig Veda -Verse 19, Chapter 164, Tome 1) and the energy completion cycle with energy given out by the north pole and the south receiving it, while nourishing all those within it. (Gautam, 2014). *Kshethrams* were first built and around which villages or settlements started to form, rather than building one where space is available as is seen today (Asian Art Museum, 2015) indicating how central it was to life or the *dinacharya* of people, right from the moment they are waking-up.

Waking – Up

The dictum of the Vedas to the devout performing the rituals is to wake up during *brahmamuburt* (ambrosial hours) as specified in the Astanga-Hridayam. It is found that, in humans and most diurnal mammals, melatonin is secreted at night with a robust circadian rhythm and plasma levels that are higher around 3 to 4 AM. Exposure to light soon afterwards, impacts positively on the regulation of Circadian rhythms and Melatonin secretion (Lewy, Wehr, Goodwin, Newsome, & Markey, 1980). Though the effects are yet to be completely understood, effects include the regulation of sleep-wake cycle and acting as a neurogenic/neuroprotective agent (Khullar, 2012). Though this is in support of the positive effects of the practice, no conclusive evidence can be seen for the hypothetical claim about atmospheric oxygen levels being at its peak during *brahmamuburt*. Rather the existing evidence indicates that the almost absence of light would only increase the chances of plants being in the cellular respiratory mode and exhaling carbon dioxide or most possibly equalizing the inhalation of carbon dioxide and exhalation of

oxygen as indicated by the (light) compensation point (Timm, Stegemann, & Küppers, 2001)

Morning Bath

Once awake, the devout is to visit the temple for prayers, after cleansing oneself after an early morning bath, referred to as 'pratah-snana' in the Kurma Purana, in the absence of which a person remains impure and incapable of performing the daily activities a person has to perform, like that of worship. To dip oneself into a pond early in the morning hours, as is the custom, would greet the devotee with nothing but water that is intensely cold. The reason being in circulation for the enactment of the cold-water dip is that of cleansing the body of impurities; but there may be a scientific explanation to the same. On investigating the effect of a cold bath on the specific gravity of the blood, it was found quite early into the research that, if the skin on the part from which the blood was taken became blanched the blood was always higher in specific gravity than before the bath (Jones, 1887) and also to increase the level of alertness (Bennetts, 1988). Exposure to cold conditions like that of cold water hitting the skin increase noradrenaline levels in the brain; lower levels of which are associated with depression (Mooventhan & Nivethitha, 2014).

The high level of cold receptors in the skin is suggestive that a blast of cold water can trigger electrical impulses to the brain, which may have an antidepressant effect (Shevchuk, 2008), and also prevent from being stripped of the healthy natural skin oils too quickly (Huffington Post, 2012). A cold water bath was also found to decrease levels of Uric acid and increase the base line levels of a major antioxidant (Siems, Van Kuijk, Maass, & Brenke, 1994). Immediately after a cold shower, the hormone Norepinephrine was found to increase in blood, impacting focus, attention, and mood positively. Elevated immunity was also observed (Janský et al., 1996), along with increased recovery rate from post exertion muscle soreness (Lateef, 2010). Washing face, hands, ears, or rubbing head (hair) ritualistically enacted in between dips, seem like acupressure movements; and is considered to contribute to the freshness of the person, by relaxing tense muscles, and even eliminating unpleasant odour (Maulana, 2014).

Walking

The devotee is to then walk barefooted towards the idol, and the bare footedness promoting the activation of several neural pathways. This is a common mechanism referred to in the Acupressure or Shiatsu models of treatment and has made references about the abundance of these points under the feet (Shizuko & McCarty, 1996). Walking barefoot, as is mentioned in the scriptures have become outdated, with people depending more on various forms of foot wares to protect the feet. Though irrelevant from the believers' point of view, whether there exist any health benefits for walking barefooted, demands an answer as far as this skeptical question is considered. Comparison between barefoot and shod walking points to Biomechanical differences that include increase in the external force loading rate, higher tibial acceleration, foot placement that is flatter, increased ankle joint stiffness and EMG intensity for the tibialis anterior that is comparatively earlier. Indirect evidence also points to the fact that barefoot training strengthens small and large muscles crossing the ankle joint. In addition, running barefoot was found to offer energetic advantages over that of shod running (Nigg, 2009)

Walking on cobblestone-mat, similar to that of walking around on the stone paved path as the scriptures say, were put to a close test with an examination of walking on health-related outcomes in older adults. 40 people with an average age of 72.6 were admitted into a 8-week cobblestone - mat walking activity (n = 22) or a control group (n = 18) under a randomized format. The Cobblestone-mat walking activity required 45- minute each of three sessions per week. Primary outcomes included SF-

12 (mental, physical) scores on health, instrumental activities of daily living (IADLs), psychophysical well-being, decrease in daytime sleepiness, and overall pain. Improvements in resting blood pressure and perceived control of falls were the associated secondary outcomes. Significant improvements in SF-12 scores, IADLs, as well as psychophysical well-being and significant decreases in daytime sleepiness and pain. Significant improvements in the perceived control over falls was also reported by the walkers. A between-groups difference was found in the resting diastolic and systolic blood pressure, with significant decrease among the walkers. It can be seen that the evidence is significantly in support of cobblestone-mat walking with respect to improving health-related outcomes in older adults (Li, Harmer, Wilson, & Fisher, 2003). Walking on a reflexology path, barefoot, stimulates the various acupressure points in the feet connected to various energy meridians, similar to that of Thoreau in his writings on walking (Holub, 2013).

Osteoarthritis (OA) has quite increased in the modern days and considering those of the lower extremity being largely mediated by aberrant biomechanical forces, hence became a choice to study if there exists any culpable underlayers to support or negate the early barefoot walking practices and that of the modern days. The peak joint loads on the hips and knees were found to be significantly lower during barefoot walking, with a noted 11.9% reduction in the knee adduction moment. Though unexplainable, the reduction in the peak joint loads could only be explained in association with the Stride, cadence, and range of motion changes of significant difference at the lower extremity joints (Shakoor & Block, 2006).

Walking in towards sanctum sanctorum (chamber housing the idol) leads the devotee into a series of doings that are heavily reliant on an auditory plane. Devotees are most often required to ring a bell, followed by the blowing of the conch (shank) by the pariakarmi or associate. All these sonic events are said to activate the auditory plane on a spiritual level as per the doctrinisms.

Bell and Conch – Sounds on arrival

Auditory stimuli, functioning as indicators of safety and danger, either allows complete freedom over mind-states or with associated arousal activates vigilance. Differences were observed in the effects caused, with louder sounds contributing to distal situational awareness while subtle environmental sounds to that of proximal situational awareness (Andringa & Lanser, 2013). Associating this observation with the sonic nature of a temple bell, it is worth noticing that the initial sound is quite louder by comparison than its echoes following soon after. Though quite unsure of the claims of a seven-distinct echo phenomenon, it may be a call made to the reclaim the wandering mind by the nature of those echoes that are decreasing in its volume and bringing a certain sense of proximal situational awareness. A place that is characterized of a particular soundscape, provides meaning to the atmosphere in which it exists (Andringa & Lanser, 2013); which may be due to conditioning.

Booi et al formulated a pleasant sonic environment to be characterized by the presence of meaningful sounds in concurrence with the character of the area. The experience of the environment is supplemented by other sensory perceptions like that of visual, olfactory and kinesthetic factors as well. This formulation of a quiet sense of place entails that model of quietness, by necessity, should rely on a holistic multi-sensory appraisal of all sound sources in context; and that few sonic factors stand out on a background of other sounds (Booi & Van-den-Berg, 2012).

The underlying mechanisms of the sonic experiences, with studies focusing more on the discovery of functions not previously explored, has led to the steering in of studies indicating amygdala responses

to be not limited to fear-related or highly unpleasant stimuli (Rasia-Filho, Londero, & Achaval, 2000) as previously estimated, which became a turning point, whence focus on stimulus valence and stimulus-related arousal as predictors of amygdala activity began. Chemosensory domain-based studies found amygdala activity to increase with the intensity of chemosensory stimuli of either valence leading to the proposal that activity in the amygdala indicates emotional arousal, at least within the chemosensory domain. In short, when amygdala activity in response to visual and auditory stimuli was investigated, researchers were able to dissociate stimulus valence and stimulus-related arousal, both on the verbal and the peripheral physiological level by selecting stimuli based on individual valence and arousal ratings. The amygdala was found to be sensitive to stimulus valence even in conditions of controlled arousal, and the increased activity was explained better by valence than by arousal.

The difference in the activity of amygdala and stimulus-related arousal between the chemosensory and the audio-visual domain can be conferred in terms of the embedding of amygdala within the sensory systems and the processes by which emotional meaning gets derived (Anders, Eippert, Weiskopf, & Veit, 2008). In short, a devotee midway into the puja cycle will be experiencing an increased level of amygdala activity, which will be a reflection of the meaningfulness of the sounds (Booi & Van-den-Berg, 2012), the emotionality and the valence associated with it. The valence being positive within the human-psyche as is always with places of worship, then the chances are high that the individual experience an emotionally aroused pleasant state.

The Prayer

Conclusive scientific backing for the beneficial effect of prayer is not yet available, though in part due to the little scientific attention received; yet prayer has always been a tool employed by people to help them cope with the various adversities of life (Harris et al., 2001). There is accumulating evidence that religiosity/spirituality are important correlates of mental health in adult populations (Wong, Rew, & Slaikeu, 2006), with things going to the extent of a research question being raised as to whether Physicians prescribe Prayer for Health; and a resultant study that sought to consider the Spiritual Aspects of Well-being. (Marwick, 1995). Frequency of prayer and presence of religious and mystical experience during prayer predict indexes of subjective well-being, but design flaws and confounding variables cast doubt on findings (McCullough, 1995). Evidence has yet to reveal large direct effects of prayer on physical health (Duckro & Magaletta, 1994).

Attempts to scientifically identify potential ways that prayer, promotes health, it was suggested that an array of prayer types exist, ranging from atonement to petitionary prayers, and an influx of reasons as to how prayer may affect health by a variety of means. No ideas were left out, including that of the placebo effect; the off chance that individuals who pray may also engage in health-related behaviour; or prayer help by diverting attention from health problems; or resulting in a unity of consciousness which facilitates the transmission of healing between individuals, or the activation of latent energies like chi, which have not been empirically verified, but may nevertheless be beneficial to health. From a point of scientific evaluation, the idea that prayer promotes health through supernatural intervention by God may seem farfetched (Breslin & Lewis, 2008). Prayer was even suggested as a relaxation response (Jantos & Kiat, 2007)

In a review of twenty research studies published between 1998 and 2004, most studies (90%) showed a higher level of religiosity/spirituality associated with better mental health in adolescents. Institutional and existential dimensions of religiosity/spirituality had the most robust relationships with mental health; and the relationship between the same were generally stronger or more unique for males and

older adolescents than for females and younger adolescent populations (Wong et al, 2006).

The Consumables at culmination

The rituals culminate when the priest (pujari) offers prasadam (bhasmam or theertham) to the devotees, who are supposed to consume. Bhasma, as per Ayurveda, is the term denoting various roasted metals used with other medicinal plants and has described several of the same which have particles with sizes in Nano range (Pathak & Thassu, 2016). Though several ancient practices have been developing nanoparticles through traditional processes, these were not identified as Nano-systems or Nano-particles. These bhasmas are biologically produced nanoparticles taken along with herbal liquids which makes these elements easily assimilable, eliminating harmful effects and enhancing biocompatibility (Kumar, Nair, Reddy, & Garg, 2006). The metals used in this preparation are Mercury, Silver, Iron, Tin and Copper while non- metallics include Silicone and Camphor. Iron and Copper are found to have some pharmacological activities as is evident from the research of Sarkar et al (2007) which reported the hematinic and cytoprotective activity of Lauha - bhasma (roasted Iron).

Tamra- bhasma (roasted Copper) and its hepatoprotective activity was studied by Tripathi and Singh (1996) which suggested of its strong antioxidant potential that could be made of use in the management of lipid peroxidation (Chaudhari et al., 2013) and would play a decisive role as signalling intermediates in health and disease (Saxena, Sonowal & Ramana, 2019). Abhra-bhasma (Mica/Siliceous encrustation) was believed to be used as a rejuvenator increasing vitality (Nasrin, Bachar, & Choudhuri, 2011). It might sound a bit far-fetched to expect nano particles in bhasmam's produced locally, using prescriptions passed down generations from a time where in modern scientific knowledge and technology was unthinkable. Silver nanoparticles (AgNPs) were green synthesised by means of the extract from Lakshmi tulasi (*Ocimum sanctum*) as a reducing and stabilizing agent rapidly in under 15 minutes (Rao, Kotakadi, Prasad, Reddy, & Gopal, 2013).

More interesting than the creation of the Nano-particles, is the strong antibacterial activity (Chen & Schluesener, 2008) and the cyto-toxic effect that the green synthesized silver nano-particles had on Cancerous Cell Lines (Kulandaivelu & Gothandam, 2016), though the mechanism(s) linked to silver nanoparticle cytotoxicity is not completely understood (Chen & Schluesener, 2008). Though dose dependent saffron aqueous extract was found to have inhibitory effects on the growth of both TCC (Transitional Cell Carcinoma) 5637 and normal L929 cell lines, which is yet another substance handed out in some temples as a form of prasadam (Feizzadeh et al., 2008).

Ayurvedic metallic preparations fused with herbal liquids were practiced within the Indian subcontinent since the seventh century BC and widely recommended for a variety of chronic ailments. The best way to propagate the knowledge and to preserve it from decay would have been the method of religious indoctrination – to inculcate it into the lives of the people; and sustenance of the same assured with the religious aura it was provided. When the high incidence of Cardiovascular events such as myocardial infarction, sudden death, and stroke was put to scrutiny, it was observed that Brachial artery flow-mediated endothelium-dependent vasodilation (FMD) is blunted in the early morning amongst healthy subjects, owing from an attributed Endothelial dysfunction (Otto et al., 2004). Decrease in cerebral autoregulation during early morning may facilitate the onset of cerebrovascular accidents; and though of particular relevance to at-risk groups (Ainslie et al., 2007), inhibition with allopurinol was found to improve peripheral vasodilator capacity and blood flow both on a local and systemic level (Doehner et al., 2002). The same being the underlying conditions and treatment for gout, a relation is suspected to exist between the two, and further suggested that curcumin or turmeric could be of benefit

in the treatment of the same (Sahelian, 2017), thus pointing to the significance of turmeric use in the temple rituals.

Conclusion

Even if all the energy, or physical and chemical properties of the supplementary substances employed in various ritualistic stages are ignored, there exists a hypothetical scenario of the space or the environment causing an impact. Developing on how the “ambiance” of a space has an effect on people designing for health care environments incorporated aesthetic enhancements in attempts to reduce stress, anxiety, increase satisfaction, and promote health and healing. A survey of existing research led to the postulation of a hierarchy of environmental elements ranging from the simply nontoxic to safe (both physically and psychologically) to that of providing a positive context to being actively salutogenic. However, researcher concentration on a limited number of settings combined with the inadequacy to inform the design guidelines for the physical elements of an optimal healing environment poses a serious limitation. Opportunities if seized, to make meaningful contributions in this area are likely to make a significant impact on health outcomes of human beings (Schweitzer, Gilpin, & Frampton, 2004).

Though, in accordance with the absence of research evidence to yet say that prayer, irrespective of the time or place indulged in at, has any significant health related direct benefits (McCullough, 1995), the fact that no study has yet considered the effect of prayer on a holistic scale remains, with some just focusing on the materials employed, some, on the rituals or adapted forms of the same, while a few, the ambiance alone. Only homogenous concepts can be studied to the full extent by inferring the idea about the whole from a small bit. Testing the significance or making an inference about the nature of prayer and the temple rituals is like making an inference about a heterogenous iceberg from an ice cube. Communication, Psychology, and Sociology are recognized as the three leading academic disciplines engaged in the social scientific study of prayer, the spiritual communication between a believer(s) and God, but even when that is the case, there exists a severe lack of collaboration, even between these disciplines, in furthering the understanding (Baesler, 2008). More studies of an in-depth holistic nature is required, to even scrape off a bit from the knowledge structures buried deep within the religious scriptures, and to understand if there is any scientific underpinning to the rituals, customs and traditions shrouded in a thick smoke of supernatural elements, that the people are conforming to, without any idea of its meaning or science behind.

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