ISSN (ELECTRONIC): 2815-0562

***Saha, Sudipta & Sharma, B. R.* (2023**). Management of Cold Perception Through Yogic Methods, International Journal of Medical Science, Vol 3, No. 02, pp. 1-8

INTERNATIONAL JOURNAL OF MEDICAL SCIENCE

(Open Access, Referred, Peer Reviewed journal)

Journal homepage : www.ijmsci.org/index.php/ijmsci

MANAGEMENT OF COLD PERCEPTION THROUGH YOGIC METHODS

Sudipta Saha[1], Dr. B. R. Sharma[2]

[1]Ph.D Scholar, Faculty of Health & Wellness, Sri Sri University, Cuttack, Odisha, India.

[2]Vice Chancellor, Sri Sri University, Faculty, Cuttack, Odisha, India.

How to Cite the Article: *Saha, Sudipta & Sharma, B. R.* (2023). Management of Cold Perception Through Yogic Methods, International Journal of Medical Science, Vol 3, No. 02, pp. 1-8

DOI Information: https://doi.org/10.56815/IJMSCI.V3I2.2023/1-8

Article History: Submission:18.07.2023, Revision: 05.08.2023, Acceptance: 22.08.2023

Keywords

Cold perception, Cold sensation, Cold response, Yoga, Pranayam.

Abstract

Background: *Winter bites really hard in some parts of our country. Sometimes that very cold sensation makes us numb especially in chest region even when we are clothed properly. Cold environment may have several health benefits, however, it may be stressful to the body and can raise several health risks like, numbness, possibilities of slips, slower metabolism, heart attack, common colds, flu, sore throat, asthma, lack of coordination and many other risks depending on the cold responses and cold tolerance of the body. A sense of coldfeeling may occur for other reasons also. It can be produced eitherby external stimulus, or due to some undesirable conditions in the body itself. Body has its own internal system of thermoregulation in response to the temperature variations to maintain the temperature homeostasis or the core body temperature neutral. However, it is observed that the human body's heat retention capacity is much less efficient than its ability to dissipate heat in cold circumstances. Yoga techniques may give additional support to the functioning of thethermoregulatory system of the body. This article is aimed to describe briefly the causes of cold perception, the internal defense mechanism of body in response to cold and some yogic practices to get relief from the same.*

Methods: *Relevant literatures and research papers have been searched to study and find the information on the above-mentioned subject and the relevant yogic practices to manage it. This article is written based on the information obtained from them.*

Conclusion: *Cold may cause stressful conditions to the body. Body is constantly working towards maintaining the core body temperature steady. However, we may explore to find the possible supports from yoga techniques to relief the load of the*

thermoregulatory system. Yoga offers a range of methods to defend the cold sensation. Though anumber of studies have been done on different yogic techniques and established their positive effects on human body and mind for various physical and mental causes, but not many studies have been done on yogic management of cold sensation in the body. There are several yogic techniques which can be studied for better understanding oftheir functioning and effectiveness on human body to manage the cold perception.

Introduction

Winter plays harsh in some parts of our country. Sometimes that very cold sensation makes us numb especially in the chest region even when we are clothed properly. Cold environment may have several health benefits; however, it may cause coldstress to the body and raise several health riskslike, common cold, flu, muscle stiffness, possibilities of slips, injuries, diminishing muscular strength, slower metabolism, heart attack, asthma, lack of coordination and other risksdepending on the cold tolerance and responses of the body. A cold feeling may occur for several reasons. It can be produced either by external stimulus, or due to some undesirable conditions in the body itself.

Body's temperature is monitored, controlled and maintained by a dedicated thermoregulatory system including nerves, muscles, organs, glands, nervous system, and circulatory system. The main regulator of this system, hypothalamus is presentin the brain. Any disturbance in the stability of body's core temperature due to heat or cold is controlled by internal physiological mechanisms ofbody.

There are primarily three ways to either decreaseor increase heat loss from the body's outer surface. These are:

- trapping more or less warm air by erecting the hairs of the skin
- Shivering or sweating
- control of blood flow tothe skin (vasoconstriction or vasodilation)

Our body works through a complex network ofnerves, muscles, glands and organs to maintain the thermal stability in the body when any changes dueto temperature variations take place inside or outside it. Cold perception is one such condition which has been discussed here. This article aims to describe briefly about cold perception, causes, internal defense mechanism of body in response to cold and some yogic practices to get relief fromthe same.

According to the University of New Mexico, body works in a well-integrated and coordinated way to manage temperature variation. Human body keeps a strict balance between heat loss and heat gain to maintain a constant core temperature ("How Is Body Temperature Maintained?", 2020). It is also natural human behaviour to respond to this situation in a number of ways (e.g., clothing insulation, seeking warm place during cold feelings). However, managing cold sensation by the means of the body itself may turn out to be a challenging work. For instance, any physicalactivity increases the blood flow and feel the body warmer, but strenuous activity during extreme coldsituation may be harmful for the body. "Working incold weather may increase the risk of injury tomuscles, […] may also lead to viral infections and chronic lung diseases" (Mäkinen et. al, 2014). It is also noticed that body tissues, are quite sensitive totemperature variations. Even a little increase intemperature can make tissues softer while adeclining temperature can result in a stiffer tissue response (Abramowitch et. al, 2016). Hence, not very strong physical activities but the activities in moderation like some yoga practices may provide added support to the thermoregulatory system in managing the situation. There are various yogic techniques which may be useful in assisting the process of thermal regulation more

Saha, Sudipta & Sharma, B. R. **(2023**). Management of Cold Perception Through Yogic Methods, International Journal of Medical Science, Vol 3, No. 02, pp. 1-8

efficiently.

Literature Review

Cold perception and possible causes behind it

Feeling cold may be described as a perception of sensing lower temperature than normal in the body due to some external or internal stimulus.

The perception of feeling cold may vary from person toperson with same temperature depending on one's body size and composition, clothing, metabolic response (any reaction by the body to a specific influence or impact), energy expenditure (theamount of total energy to maintain constantconditions in the body and to carry out all physicalfunctions and activities), age, gender etc. One may also have the feeling of cold even when body temperature is normal or high like in case of fever or some infection.

There are several reasons when one may feel cold. There may be instances of -

- Cold sensation due to cold weather condition or setting very low temperature in an airconditioned environment
- Hypothyroidism also called underactivethyroid, is a condition when the thyroid doesn't release enough thyroid hormone into the bloodstream. Consequently, it brings some unwanted condition likeslower metabolism, feeling of tiredness, weight gain, muscle weakness, and one
- ay become too sensitive to cold temperature.
- Hypothermia, a condition when one feels cold because that person's bodytemperature falls below the normal level and body is not able to generate the required heat to maintain the thermal stability in the body.
- Cold intolerance because of anorexia (a condition of eating disorder and a fear of wrong perception of gaining weight) and anemia (a condition of lack of sufficient healthy red blood cells which carry adequate oxygen to our body tissues)
- Chills due to some cases of fever, infections and physical conditions like, spasms in the arteries of hands and feet (Raynaud's disease), atherosclerosis (plaque builds up in the arteries of thebody), diabetes etc.

Internal defense mechanisms of the body in response to cold

Cold perception might the cause of cold stress to the body. When the skin temperature goes down and eventually the internal body temperature falls, then cold stress follows. A condition when body is not able to warm itself by its own means. Hence it is the thermal load which body bears, when greaterthan normal heat losses occur or are anticipated and compensatory thermoregulations are required to maintain the normal body temperature.

Body temperature is regulated by physiologic mechanism and behavioral mechanism (Tan et. al, 2018). Hence a fall in body temperature ismanaged by the means of physiologic path of the thermoregulatory system and through behavioralhuman activities for self-protection.

Physiologic Mechanism

Core body temperature is maintained by an effective thermoregulatory system in the body. It works to uphold the optimum human body temperature which is 37°C or to keep the body temperature within a narrow range even when the surrounding temperature is different through a chain of actions by

different parts of the system. This system includes hypothalamus in the brain, nerves, glands, organs, skin, and circulatory system. Hypothalamus, a small part of our brain, plays significant roles in the process of thermoregulation to maintain body's core internal temperature at optimal level.

Hypothalamus intervenes and regulates the temperature of the body, and balances the production and conservation of heat and the loss of heat. The mainsource of the thermal energy in the body is produced by metabolic processes in the active visceral organs (organs located within the threecentral cavities of chest, abdomen and pelvis) and tissues. Body heat is generated mostly in the deep organs, especially the liver, brain, and heart, and in contraction of skeletal muscles. It is known as obligatory thermogenesis (Axelrod et. al, 2006). Supplementary heat generation, which is known as facultative thermogenesis, occurs voluntarily through muscular activity (e.g. physical work out) and protective activity (e.g. wearing thermal clothes) or involuntarily by the autonomic nervous system and endocrine system.

The function of skin in cold sensation

Human skin acts as the wall of protection for the internal body organs from the externalenvironment and it plays important roles to keep the core body temperature nearly constant. Again, skin is the major organ, responsible for approximately 90% of heat loss (Koop et al. 2021).

The cold receptors (the thermo sensory fibers which respond to cold) of the skin are stimulatedas the skin is exposed to cold. A perception of the temperature variation in human body, leads thecold receptors of the skin to send signals to the central nervous system (CNS) via peripheral nervous system pathway. Sensors in CNS send signals to hypothalamus, the segment of the brain linking the endocrine system to the nervoussystem. In response, it sends signals to different organs and systems in the body to work to prevent heat loss. They respond in a number of ways according to the change in the body temperature. (Tan, C. L., et. al. 2018)

The primary physiologic responses to cold exposure are, Brown adipose tissue or BATthermogenesis, Stimulation of the sympathetic nervous system which causes the constriction of blood vessels or vasoconstriction in the skin and limbs and Skeletal muscle shivering. Body responds in a various way to the cold conditions. The physiologic responses occur in the body inresponse to the same are described below:

- BAT Thermogenesis: A process by which the body produces heat. An essential thermogenic organ called brown adiposetissue (BAT) uses glucose and lipids asmetabolic fuels to burn fat to produce heat and keep the body warm in the winter. In addition to a few species of thermogenic plants, it occurs in all warm-bloodedanimals.
- Vasoconstriction: In this process, the bloodvessels under the skin are constricted. In order to maintain heat retention and keep the interior body warm, it reduces blood flow to the skin. Vasoconstriction is the process by which blood vessels narrow,reducing heat loss through the skin andenabling the body to maintain a certain level of heat balance. Below the thermoneutral zone (the range of outside temperatures where there are no regulatoryshifts in the amount of heat produced by metabolism or lost through evaporation), metabolic reactions, as well as shivering occur.
- Shivering: Muscles, organs, and brainproduce heat in a variety of ways. For example, Muscles produce heat by shivering. When body senses too cold, its automatic response is to tightening and relaxing the muscles rapidly to warm up the body. Studies say that heat- producing muscular shivering is

stimulated only when the spinal cordbecomes cooler (Hissa., 1990)

- Hormonal thermogenesis: Thyroid gland releases hormones to increase metabolism. This action increases the energy our body creates and the amount of heat it produces.

- Trapping warm air to insulate: Tiny muscles in the skin quickly pull the hairs upright.

  Erected hairs trap the air and reduce the heat loss.

Behavioral Mechanism

Behavioral changes naturally occur to human with the feeling of cold. Instances like seeking warmer place, wearing clothes to keep body warm, doing some movements or exercises etc. are the behavioral activities which are motivated to getrelief from the cold sensation. (Hall, J.E. 2016). Heat also received by conduction (by the means of direct contact with warm item), convection (though the movement of warm air or liquid) and radiation (passively from the environment or other hot source) through skin.

Some human activities in response to cold feelings are,

- Increase in the clothing insulation
- Increase the temperature using the temperature control appliances
- Increase the frequency and duration of some limited behavioral responses like warm drinkintake or seeking to warmer sources
- Physical activities like walking, physical workout

Yogic management to ease Cold perception

The center of a person's body should always be kept warm for the management of cold stress, according to the Centers for Disease Control and Prevention (2019). It is said according to yoga texts that various yogic methods can raise the temperature in our body. However, yogic techniques have contra-indications, therefore it is needed to assess one's physical capability and conditions before applying them. Following are some of the yoga practices to improve the perception of cold -

- Yogasana: A few minutes of Yogasana practicemay be helpful to bring a change to the perception of cold. Yogasanas like Pada hastasana, Shashankasana,Pashchimottanasana (Yoga Mala, 2010, P.29) are helpful to get relief from cold sensation. Asanas which keep the core engaged like Naukasana, Chaturanga dandasana,Utkatasana, or the practice of Surya Namaskar (Swami, S.2012, P.162) which engages the whole body, are some of the yoga postures to get a relief from cold perception.
- Pranayama/Kriya: In pranayama practice, breathe is utilized voluntarily by controlling itsflow in different pace for the expansion of the life force or energy of the practitioner (Swami,S., 2012, P.369). Breathe is also used in some yogic kriya practices for internal cleansing. Voluntary breath regulation is a way to modifyspecific physiological functions through the respiration (Telles et. al, 2020). These practices are said to strengthen the nervoussystem and stimulate the energy in digestive organs of the body. The organic processes of these organs are some of the sources of heat generation in the body.

  Some of the pranayama and Kriya which may be used to raise body temperature as stated in different yoga texts, are, Bhastrika Pranayama (Swami,S., 2012, P. 407), Suryaveda pranayama(Swami, S., 2012, P. 417), Ujjayi pranayama (Swami, S., 2012, P.403), Kapalbhati (Saraswati, N. 2012, P.411), Agnisara (Saraswati, N. 2012, P.506), Nauli (Saraswati, N., 2012,

Saha, Sudipta & Sharma, B. R. **(2023**). Management of Cold Perception Through Yogic Methods, International Journal of Medical Science, Vol 3, No. 02, pp. 1-8

P.518).

- Mudra: Yoga offers the practice of Mudra or gesture, is also defined as seal (Saraswati, N., 2012, P.421). A mudra can be practiced using body parts (to make different signs), breathe, awareness and concentration on particularparts of the body. Some mudras are known to be useful for generating heat in the body.

For example Surya mudra, Linga Mudra (Hvenkas 2015), Ganesh Mudra ("Ganesh Mudra",2020) are said to raise the body temperature.

Methods

Relevant literatures and research papers have been searched through search engines of Google and micro soft Bing to explore and find theinformation on this subject and a few text books of yoga have been studied to find the relevant yogic practices to manage it. This article is written based on the information obtained from those sources.

Findings and Discussion

We have known that the body uses its resources and intelligence to keep the stability in the core body temperature during thermal variations. However, sometimes it demands to take voluntary actions to support and relieve the functional loads of the body during a challenging time, especially when extreme temperature deviation occurs.

It has been found that the human body's mechanisms for retaining heat are noticeably less effective than those for releasing heat. Nevertheless, it varies based on physical condition,since physical fitness and metabolic heat production are directly correlated (Bittle, 1988).Practices of yoga have stood the test of time and are designed to improve and keep up good healthin all respects. The functions of visceral organs andcirculatory system are the major sources of heat generation and constituents of the thermoregulation process. Since as a preventivemeasure center of the body should be kept warmso forward bending asanas which cover the chest region are supposed to ease cold perception.

The visceral organs and circulatory system, can both be strengthened through the use of various yogic techniques. One of the most helpful yogic methodsfor the management of cold sensation can be attributed to the practice of pranayama. Hence the yoga techniques of asana and pranayama which engage the organs, glands and the muscles of the abdomen and chest are likely to be helpful to manage the feeling of cold. Another form of yogic technique, mudra, some of which are mentioned here may be useful in this regard. For instance, the gesture of Linga mudra practice needs both palms to clasp together along with another symbolic gesture included in it (Palaniappana, S. et. al., 2021). It is in fact a natural gesture which is often adopted by us when we feel cold. Yogic techniquesare originated mainly through observations which include our being, other beings and nature. If we observe and explore various forms of yogictechniques, we can easily relate how different forms of yogic techniques penetrate and work on our different body parts to make them work more efficiently.

Conclusion

Cold may cause stressful conditions to our body. Body is constantly working towards maintaining the core body temperature steady. Human thermoregulatory system consists of some connected components of skin, nervous system, hypothalamus in the brain, skeletal muscles, glandsand organs.

Though body has its own autonomous functioning, it also has the proviso to let us workon it at our

will with limits. We need good observation to understand the functioning of our body at different situations and act accordingly. While choosing the yogic processes, we should keep in mind to support and strengthen the physiologic components of the thermoregulatory system. Hence the selection of asana, pranayama or any other yogic processes should be appropriate to support and give relief to the system from cold conditions. We got the mention of various heat raising yogic techniques inclassical texts on yoga. Not many research studies have been done for the management of cold perception through those techniques. They can be used and explored further for an insightful understanding of their effectiveness on human body to manage the issues related to cold conditions.

Source of funding: NIL

Conflict of interest: Nil

ethical guidelines: Followed

Consent to participate: Not applicable

Consent for publication: Yes, all authors gave their consent for the publication**.**

Availability of data and material: The data that support the findings of this study are available

from the corresponding author upon reasonable request.

References:

- Axelrod et al. (2006) Temperature Management in Acute Neurologic Disorders. *Critical Care Clinics.* 22(4).767- 785.https://doi.org/10.1016/j.ccc.2006.06.001
- Bitesize (n.d.). *Maintaining internalenvironments. – Control of Body temperaqture.*
- https://www.bbc.co.uk/bitesize/guides/zgqcmsg/revision/2
- Bittel et al. (1988). Physical fitness and thermoregulatory reactions in a cold environment in men. *Journal of AppliedPhysiology.*65(5):1984-9. doi:10.1152/jappl.1988.65.5.1984.0
- Centers for Disease control and Prevention, USA.gov (2019). Prevent Hypothermia & Frostbite. https://www.cdc.gov/disasters/winter/staysafe/hypothermia.html
- Ganesha Mudra (2020). *Yogapedia.* https://www.yogapedia.com/definition/6873/ganeshamudra#:~:text=Ganesha%20mudra%20 is%20a%20yogic%20hand%20gesture%2C%20which,to%20overcome%20anything%20that%20is%20holding%20one%20back.
- Hall John E. Guyton And Hall Textbook Of Medical Physiology, Thirteenth Edition, 2016.Elsevier. ISBN: 978-1-4557-7005-2
- Hissa. (1990). Central control of bodytemperature. A review. *Arctic Med Res.*49(1):3-15.
- https://pubmed.ncbi.nlm.nih.gov/2180414/
- How Is Body Temperature Maintained? (2020, April 16). https://www.reference.com/science/body-temperature-maintained-e11e175f9cbb833
- Hvenkas (2015). Mudra for Coldness of body. *Complete Health.*
- https://www.completehealthinfo.com/mudra-for-coldness-of-body/ Jois, K.Pattabhi, (2010) *Yoga Mala*.

Health & Fitness: North Point Press Kingma et al. (2012) The thermoneutral zone: Implications for metabolic studies. Frontiers in bioscience. 4(5):1975-85. DOI:10.2741/E518 Lans et al. (2013). Cold acclimation recruits human brown fat and increases nonshivering thermogenesis**.** *J Clin Invest.* 123(8):3395- 403. doi: 10.1172/JCI68993.

- Lindsey K. Koop & Prasanna Tadi. (2021).

  Physiology, Heat Loss. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK541107/ Palaniappana, S., Siddhanb, R. M., Sengottaiyanc , A., Mohanrajd , S., Paul, R.(2021).
-
- Effect of Lung Specific Yoga Mudras on Pulmonary Function Tests in subjects with FEV1% predicted values less than 80% . International Journal Of Scientific ResearchIn Dental And Medical Sciences 3 (2021) 117–121
- Rintamäki. (2007) Human responsesto cold. *AlaskaMed.*49(2):29-31.

- https://pubmed.ncbi.nlm.nih.gov/17929604/ Saraswati, Swami Niranjanananda (2012).

- *Gheranda Samhita* :Yoga Publication Trust,Munger, Bihar, India

- Saraswati, Swami Satyananda (2012). *Asana Pranayama Mudra Bandha* : Yoga Publication Trust, Munger, Bihar, India

- Tan C. L. et al. (2018). Regulation of BodyTemperature by the Nervous System. *Neuron.*98(1): 31–48. doi: 10.1016/j.neuron.2018.02.022

- Telles et al. (2020) Body temperature in practitioners of a yoga breathing techniqueconsidered to be heat generating.
  International Journal of Yoga, 13(2):168-172.doi: 10.4103/ijoy.IJOY_70_191.