GREENTREE GROUP PUBLISHERS

IJAPC

Volume 10 Issue 3

10 May 2019

WWW.IJAPC.COM
E ISSN 2350 0204

Int J Ayu Pharm Chem

REVIEW ARTICLE

www.ijapc.com

e-ISSN 2350-0204

A Review on *Vyayama* as *HetuVipareethaUpashaya* in *Madhumeha* (Diabetes Mellitus Type 2)

GeethaNayakS[1*], Ajantha[2], Anuradha B[3], Anand S[4]

[1-4]Department of RogaNidana&VikrutiVignana,Sri DharmasthalaManjunatheshwara College of Ayurveda and Hospital, Hassan, KA, India

ABSTRACT

A close look into *hetu* of *madhumeha* expounds *swapnasukha* as an important *viharajahetu* pointing to sedentary lifestyle. In this context most important *hetu vipareetha upashaya* would be*vyayama*, as it brings *sukhanubandha* to patients by regulating and normalizing attributes involved in pathology of *madhumeha* (DM-type2) including blood glucose level. This is a highly rewarding concept of scientific rationale in management and dates back to *Shushrutasamhita* advocating graduated exercise separately for different class of people suffering from *madhumeha*. Contemporary modern approach to an extent simulates, advocating aerobic and resistance exercises for DM-type2 with their own benefits.

KEYWORDS

Vyayama, Upashaya, Madhumeha

Greentree Group Publishers

Received 06/02/19 Accepted 12/04/19 Published 10/05/19

INTRODUCTION

Madhumeha (DM type-2) refers to a metabolic disorder exhibiting an important characteristic feature, tanu madhuryatha (hyperglycemia). The causes and features of madhumeha explained in ayurveda stimulates with Diabetes mellitus type-2. The word *prameha* is derived from two words*pra* and *meha*, the prefix *'pra'* means *'prakarshena'* (frequency / quantity) and suffix *'meha'* means *'mihasinchane* (excess/ profuse)'. *Acharya Charaka*while describing disease *prameha*, mentions that all types of *prameha* ultimately progress towards *dathu ksaya* landing up in *madhumeha* with *vatadosha* dominance[1]. *Sushruta acharya* has explained various graduated *vyayama* (physical activity) as one of the modality in management of *prameha*. Clinically *madhumeha* is a disorder seldom cured, but best managed with constant medication, *pathya* (wholesome diet) and *vyayama* (physical activity). Scientific evidences suggest interrelationship between physical activity and DM-type2 regulating blood glucose levels. Muscle cells are one among the main targets for insulin sensitivity, promoting glucose utilization. Diabetics without exercise are three times more likely to have poor diabetes control and more likely to suffer from related complications. Hence *vyayama* is one among the cornerstone in the management of *madhumeha*.

Medicines, diet and regimen that bestow comfort either by acting directly against the cause of disease / disease / both, are considered as *upashaya*[2]. *Upashaya* implies factors like medicines, diet and regimen imparting *sukanubandha* in an individual[3]. *Vyayama* helps as *viharaja hetu vipareetha upashaya* in *madhumeha*. Here,*viharaja* means regimen, *hetu* means cause, *vipareetha upashaya* means even though being opposite attribute still bestows comfort. Thus in this context *swapnasukha* (pointing to sedentary lifestyle) being the cause, *vyayama* acts as *viharaja hetu vipareetha upashaya.*

MATERIALS AND METHODS

Analysis of *vyayama* as *viharaja-hetu-vipareeta-upashaya* in *madhumeha* (DM-type2) in the light of *samhitas* and contemporary modern science is dealt in this paper.

Viharajahetuinmadhumeha:

Acharya Shushruta on the basis of etiology has mentioned two types of *prameha* as *sahaja* (hereditary) and the other as *apathyanimittaja* (acquired)[4]. Further it is noteworthy that *madhumeha* is included under *apathya nimittaja prameha*, predominantly acquired due to sedentary

lifestyle with little or minimal physical activity. *Acharya Charaka*, identifies *swapnasukha* (lack of physical activity) as one of the main cause of *prameha*[5]. In the present scenario, *swapnasukha* is considered as sitting idle for long hours or lying down while reading, watching television etc; this basically means lack of activity/ exercise to body. People sitting still for more than 4 hours per day have a 40 percent higher riskof development of diabetes mellitus type-2 than, personswho sit less than 4 hours per day. However, subjects indulging in active exercise at least 4 hours per week are,as healthy as those subjects who sit lessthan 4 hours per day[6].

Concept* of *upashaya*:Upashaya* bestows *sukha-anubanddha*(pleasure)as long as it is followed. It can be administered in the form of *aushada, ahara, vihara,* either *vipareetha* or *vipareetha-arthakari*to *hetu* and *vyadhi*[7].In *madhumeha* (DM-type2) considering *swapnasukha* as an important *hetu, vyayama* is an appropriate *hetu vipareetha upashaya* to be adopted for successful management.

Vyayama as hetu vipareetha upashaya:

Vyayama (physical activity) is defined as physical activity desirable and is capable of bringing about *sthairyartha* (bodily stability) and *dehabala* (strength) when performed in adequate *matra* (amount)[8]. *Tulabrma* (excersice performed by revolving heavy weights / heavy weapons), *gunakarsha* (pulling of rope), *dhanurakarshanadi* (fastening arrow to bow) are different forms of *vyayma* (physical activity) providing *ayaama* (stretching) to *shareera* and is affirmed as *vyayama* in *Dhanurveda*[9].

Physical activity performed in moderate quantity bestows feeling of lightness of *shareera* (body), *karmasamarthya* (ability to work), *medaskshaya* (reduction of body fat), *vibhaktha ghana gatratvam* (renders finely proportionate contours and consistent body structure)[10], *doshakshaya* (alleviates doshas) and *agni vriddhi* (stimulates power of digestion) [11].

Strong person and those accustomed to fatty food are advised to perform *vyayama* (physical activity) to half their strength during hemantha, *vasantha and shishira rutus*. However in all others seasons comparatively, amount of *vyayama* (physical activity) performed should be less. Physical activity if performed in excess causes *shrama* (exertion), *klama* (exhaution), *kshaya* (depletion of body tissues), *trushna* (thirst), *rakthapitta* (bleeding disorder), *pratamakah* (dyspnoea), *kasa* (cough), *jwara* (fever), *chardhi* (vomiting)[12].

Acharya charaka has mentioned objective parameterto evaluate performance of accurate amount of exercise. It includes

sweda-agama (perspiration), *shwasavruddhi* (enhanced respiration), *gatralaghava* (lightness of body), *hrudaya-uparodha* (maximum threshold stimulation of heart). *Vyayama* (physical activity) is contraindicated in person emaciated due to *ati-vyavaya* (excessive sexual activity), *baraharana* (weight lifting), *adhwa* (walking in excess), people afflicted with *krodha* (anger), *shoka* (grief), *bhaya* (fear), *aayasa* (exhaustion), *bala* (children), *vruddha* (geriatric), *pra-vata* (vatika bodily constitituiton), *bahu-bhashaka* (indulging in excessive speech), *kshudhita* and *trushna* (afflicted with hunger and thirst)[13].

Acharya Shushruta has advised various *vyayama* (physical activity) in management of *madhumeha* that includes *niyuddha* (wrestling), *krida* (sports), *gaja-turaga-rohana* (riding on elephant and horse), *parikramana* (brisk walking), *shastra-prayoga* (indulging in practice of various weapons bestowing *vyayama* to body). Further different types of *vyayama* is advocated for different class of people like *padatrana* (walking bare foot from village to village), *mrugaihi saha vaseth* (leaving with animals and taking care of those animals), *krusheth satatatam* (working in the field for extended period), *khanedhva kupam* (digging well)[14].All these clearly comprehensively point towards different graduated physical activity / exercise to be practiced in management of *madhumeha* for maintenance of health.

Physical activity in contemporary sense is understood as, any kind of activity involving body movement resulting in burning calories. Exercise is a form of physical activity that involves a series of repetitive movements[15]. The number of calories burnt depends on the sport or activity and intensity level. *Niyuddha* (wrestling) is an activity involving major groups of muscles of body of both upper and lower limbs being actively used along with trunk. It increases the lung capacity and strengthens the respiratory muscles and also provides cardiovascular endurance. *Krida* (sports) like running, swimming, basketball, football, volleyball, baseball, golf, hockey etc improves joint flexibility and range of movementand also improves body's ability to transport and utilize oxygen in lungs and blood. *Gaja-turaga-rohana* (riding animals) tones and strengthens the muscles of abdomen, thigh, pelvis and arm. *Parikramana* (brisk walk) tones up all the muscles of upper and lower limb including the abdominal muscles, thereby helps in improved glucose utilization. *Shastra-prayoga* (archery) improves hand and eye coordination. It increases concentration of mind and exerts activity to trunk with both upper limbs. It trains the upper limbs to work in synchrony

while aiming and firing the arrow based on input from the eyes. It also improves balance of the body. It increases hand and finger flexibility. *Padatrana* (walking bare foot) strengths muscles of lower limb, improves balance, proprioception, improves blood circulation in the body. It stimulates acupressure points of foot stimulating nerves and thereby acts on different systems of the body. *Mrugaihi saha vaseth* (living with animals) implies walking, running, playing, feeding, bathing, milking animals, etc. This contributes to adequate physical activity. *Krusheth satatatam* (working in felid)involves activities like ploughing, milking a cow, shoveling grain, forking straw bales, feeding animals contributing to physical activity. *Khanedhva kupam* (digging well) brings about movements of whole body, provides stability and activity. Exercise / physical activity bestows both physical and mental health and fitness. It improves mental health by influence of certain hormones. Exercise in form of physical activity confers ease to humans to fight against anxiety, improve mood and fight depression. It promotes release of serotonin and endorphins. The above exercises broadly include aerobic exercises and resistance exercises.

Aerobic exercise:

Aerobic exercise improves oxygen consumption and improves functioning of cardiovascular and respiratory systems. The rapid increase in energy requirements during exercise requires equally rapid circulatory adjustments to meet the increased need for oxygen and nutrients to remove the end products of metabolism such as carbon dioxide and lactic acid and to dissipate excess heat. The shift in body metabolism occurs through a coordinated activity of all the systems of the body; neuromuscular, respiratory, cardiovascular, metabolic and hormonal[16]. Aerobic exercise is a valuable therapeutic strategy for DM-Type2, as it has beneficial effects on physiological parameters and reduces metabolic risk factors in insulin resistance diabetes mellitus. It comprises of swimming, cycling, treadmill, walking, rowing, running and jumping-rope etc[17]. Aerobic exercises facilitate to normalize physiological parameters, including glycemic control, fasting blood-glucose level and lipid profile. Further restores the endothelial function and reduce arterial stiffness contributing to enhancing cardiac health and reduce cardiovascular complications. Physical activity / exercise enhance glucose uptake into skeletal muscle through glucose transporter (GLUT4) in muscle cell membranes[18]. Deficiency of insulin receptors in DM-Type

2 is observed, leading to impaired glucose uptake and GLUT4 translocation. But *Vyayama* (Physical activity) aids to restore the defects of insulin by providing GLTU4 translocation.

Resistance exercise:

Resistance exercise facilitates proper glucose control and reduces insulin resistance among DM-type2. Resistance exercise are many in number like static, dynamic, concentric, eccentric, isokinetic, manual, mechanical etc[19]. Resistance exercises include activities that have to be performed against resistance like weight lifting etc. Resistance exercises are relied on the equipment. Resistance exercises have potential to increase muscle strength and bone mineral density. It enhances functional status and contributes to attain glycemic control. Thus, the above mentioned *vyayama* (Physical activity) acts as *hetu vipareetha vihara* to *swapna sukha*, one among the important *nidana* involved in the causation of *madhumeha.*

DISCUSSION

In *prameha* indulgence in *nidana* results in *tridosha prakopa* and afflicts *dushyas* like *medha, raktha, shukra, ambu, vasa, lasika, majja, rasa, ojas* and *mamsa*. This *dusta dosha* along with *dusta dushyas* undergo *sammurchana*, afflicts *mutra* and is eliminated out through *mutravaha srotas*, with manifestation of cardinal features of *prameha* like, *prabhuta mutrata* (increased quantity and frequency of urine) and *avila mutrata* (turbidity of urine). Further though *doshas* and *dushyas* remain same, their permutation and combination brings about the difference in the presenting symptoms like colour of the urine etc in different types of *prameha*.

Vyayama (physical activity) reduces polyurea and glycosurea by optimizing the fluid balance, improving digestion and metabolism in the body, thereby effecting on *bahudrava sleshma* and *kleda*. Exercise reduces blood glucose through an increase of insulin-dependent and insulin-independent glucose transport to working muscles thereby showing its effects on *raktha*, *lasika* and *tanu-madhuryata.* It contributes to normalize metabolism thereby effects positively on *agni* and *rasa dhatu*. Exercise effects *mamsa dhatu* by increasing translocation of glucose transporter-4(GLUT 4) to the surface of muscle cells increasing the muscle sensitivity to insulin. Further it effects on *abadda medas* and *vasa* by reducing LDL and Triglycerides, thereby regulates dyslipidemia and body fat. It promotes *shukra dhatu* by effecting testosterone level and maintaining HPG axis thereby improves sexual functions. Immunity is

promoted with increase in neutrophil and lymphocyte proliferation. Hence, considered to promote *ojas*.

It is clear that physically active lifestyle aides in management of *madhumeha* (DMT2), as it is a lifestyle resulted disorder. In *Ayurveda* since ages, *vyayama* (physical activity) is propagated as a cornerstone in the management of *madhumeha* (diabetes mellitusT2) along with nutrition and medication. Always it is beneficial to begin with small bouts of *vyayama* (physical activity) of low intensity and then gradually increased. Rating of perceived exertion scale (RPE) is a widely and frequently used quantitative measure of perceived exertion during physical activity. It can be employed as a reliable indicator to monitor and guide exercise.

CONCLUSION

Vyayama is easiest and safest *viharaja hetu viparethaupashaya* to *swapna-sukha* (sedentary lifestyle) in *madhumeha* (DM-type2) as it bestows *sukhanubandha* by reduction in blood glucose level and improves quality of life in *madhumeha*(DM-type2) patients.Therefore, the main aim of *Ayurveada swasthya-rakshana* and *vikara-prashamana* is achieved by practicing *vyayama* in *madhumeha* patients. *Swasthya-rakshana*is achieved by following *vyayama* in people with risk ofhereditary predisposition to DM type 2 and *vikara-prashamana* is attained by increasing glucose utilization and affecting other attributes in pathology of *madhumeha*. Thus, a well planned *vyayama* would yield a healthy and quality life in *madhumeha* suffering patients and also those at a risk of developing *madhumeha* (DM type2).

REFERENCES

1. Vagbhata, Ashtangahridaya with sarvangasundara commentary, Ed. Acharya H S SParadhakara, Chaukambha Sanskrit sansthan Varanasi, 2009, Nidanasthana. 10/18-21: p. 504.

2. Acharya Agnivesha; CharakaSamhitha; redacted by Charaka and Dridabala with Ayurveda Dipika Commentary by Chakrapani Dutta; Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2015, Nidanasthana. 1/10: p.195.

3. Madhavakara, Madhavanidana with madhukosha commentary by vijayarakshitha and srikanthadatta, Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2010, chapter 1/ 8-9: p.14.

4. Susrutha ,susruthaSamhitha with nibandhasangraha and nyayachandrika commentaries, Ed. Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2014 , chikitsa sthana11/ 3: p.451.

5. Acharya Agnivesha; CharakaSamhitha; redacted by Charaka and Dridabala with Ayurveda Dipika Commentary by Chakrapani Dutta; Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2015, chikitsasthana. 6/4: p.445.

6. https://en.m.wikipedia.org/wiki/sedentary_lifestyle (seen on : 5-2-2019 at 1:00pm)

7. Madhavakara, Madhavanidana with madhukosha commentary by vijayarakshitha and srikanthadatta, Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2010, chapter 1/ 8-9: p.14.

8. Acharya Agnivesha; CharakaSamhitha; redacted by Charaka and Dridabala with Ayurveda Dipika Commentary by Chakrapani Dutta; Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2015, sutra sthana. 7/31: p.50.

9. BhaskargovindaGhanekara, Vaidhyakiyasubhashithasahityam; chaukambha Sanskrit samsthana, Varanasi 2003, chapter 6/1: p.29.

10. Vagbhata, Ashtangahridaya with sarvangasundara commentary, Ed. Acharya H S SParadhakara, Chaukambha Sanskrit sansthan Varanasi, 2009, sutra sthana. 2/10: p. 27.

11. Acharya Agnivesha; CharakaSamhitha; redacted by Charaka and Dridabala with Ayurveda Dipika Commentary by Chakrapani Dutta; Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2015, sutra sthana. 7/32: p.50.

12. Vagbhata, Ashtangahridaya with sarvangasundara commentary, Ed. Acharya

H S SParadhakara, Chaukambha Sanskrit sansthan Varanasi, 2009, sutra sthana. 2/11-13: p. 27.

13. Acharya Agnivesha; CharakaSamhitha; redacted by Charaka and Dridabala with Ayurveda Dipika Commentary by Chakrapani Dutta; Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2015, sutra sthana. 7/33(1): p.51.

14. Susrutha ,susruthaSamhitha with nibandhasangraha and nyayachandrika commentaries, Ed. Ed. Vaidya YadhavjiTrikamjiAcharaya; chaukambhaOrientalia, Varanasi 2014 , chikitsa sthana11/ 11: p.453.

15. https://www.mydr.com.au/sportsfitness/physical-activity-benefits-to-your-body(seen on : 5-2-2019 at 1:00pm)

16. Kisner Carolyn, Colby L Allen, Therapeutic exercise. Edition:4; Jaypee brothers medical publishers (P) LTD, New Delhi, chapter 4: p.154

17. https://en.m.wikipedia.org/wiki/Aerobic exercise(seen on : 5-2-2019 at 1:00pm)

18. Kim E Barrett, et al; Ganong's Review of Medical physiology. Edition:23; Tata McGraw Hill Education Private Limited, New Delhi, chapter 21: p.331

19. Kisner Carolyn, Colby L Allen, Therapeutic exercise. Edition:4; Jaypeebrothers medical publishers (P) LTD, New Delhi, chapter 3: p.80