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A Comparative Study of Pain Rating Index (PRI) Between HOT and COLD *Mizaj* (temperament) people

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Abstract
The main objective of medical science mainly concerned with the preservation of health, prevention of disease and to ensure healthy life of individuals. Unani system of medicine also having the same objective with its glorifying history since *Hippocratic era*. As we know pain is first feature all most all disease and commonest manifestation which force to the individual to take rest and also tends to bring the patient to physician. Pain is a condition in which an individual feels significant discomfort or an unpleasant sensation and describes it. Many factors, such as temperature, chemical, and mechanical stimulation, can induce it. In unani system of medicine *Waja/Alam* term is used for pain. *Waja/Alam* is said that it is sense against *Tabiat. Tabiat* is defined as the sum of structural, functional and psychological characteristic of human being. In this holistic system of medicine cause of pain is thought to be *Sue-Mizaj Mukhtalif* and *Tafarruk-e-ittesal. Mizaj* is base of Unani system of medicine which reflects body's physiological condition by four *Kaifiyat* which depends on humours. The aim of this article is to highlight the concept of pain in Unani system of medicine with reference to different *Kaifiyat* according to *Mizaj* and correlation with modern theories and by assessment of pain rating index (PRI) though modern pain assessment questionnaire.

Keywords: Waja, Tabiat, Kaifiyat, Mizaj, PRI

Introduction
The main concern of the *Unani system of medicine* is health of human body whereas maintenance of health is the main function of *Tabiat. Tabiat* maintain *Etadal-e-Mizaj* (normal constitution) in the body which is the basis of health [1]. *"Tabiat* is considered as constitution of human body, composed of *akhlat* (humours) and it is a power which travels inside the body, by which body reaches *kamal-e-tabae*" (normal physiological state). It is also defined as a faculty in the body by which all functions are completed [2]. *Mizaj* is a new and median *Kaifiyat*, which appears after action and reaction of different *Kaifiyat* (qualities) of *Anasir* (Elements). The concept of *Mizaj* is base of human health, disease, diagnosis and treatment in *Unani system of medicine* [3]. *Mizaj* (temperament) is defined as the quality, resulting from the reciprocal action of the four-contrary principal *Kaifiyat* (hot/cold/moist/dry) domiciled within the elements (air, water earth, fire). As long as equilibrium in the *Kammiyat* and *Kaifiyat* (quality and quantity) of *Akhlat* is maintained in the cell or body, health will be maintained, and it will continue to function correctly, and this harmonious relationship is controlled by the *Tabiat*, the *Etedal-e-Mizaj* [4]. *Mizaj* are divided into four categories known as *Damwi* (Sanguine), *Balghami* (Phlegmatic), *Safrawi* (Choleretic), *Saudawi* (Melancholic). As four *akhlat* has their own individual *Mizaj*. They (humours) combine and intermix in different quantities to form body fluid so *Mizaj* of human body depends upon that which humour is dominant or the quantity of which humour present in access in an individual [3]. *"Waja"* is an Arabic word which means pain. It is defined by Unani physicians as Perception of unease in the body caused by impaired temperament or loss in continuity. *Waja* (pain) is an abnormal perception felt by patients and denote the morbid condition of body. Under the caption of pain *Ibn-e- sina* (980-1037 AD) described that "pleasure or joy is the *Ahsase Musbat* (Pleasant perception) and *waja* is an *Ahsase manfi* (unpleasant perception). In short pleasant sensation is known as *Lazzat* (joy) and unpleasant sensation is *Waja'* [5]. The International Association for the Study of Pain (IASP) has defined "pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage" [6] with similar view expressed by *Jalinoos*. Fields *et al*. "Pain is an unpleasant sensation localized to a part of the body.

It is often described in terms of a penetrating or tissue-destructive process (e.g.: Stabbing, burning, twisting, tearing, and squeezing) and/or of a bodily or emotional reaction (e.g.: Terrifying, nauseating, and sickening)" [7]. Pain considered the sole purpose of notifying the body's defence mechanism to react towards a stimulus in order to avoid further tissue damages. Pain is a most primitive sensation of all senses, the sensation of pain is associated with the activation of the receptors in the primary afferent fibers, which is inclusive of the unmyelinated C-fibre and myelinated Aσ-fiber. Both nociceptors remain silent during homeostasis in the absence of pain and are activated when there is a potential of noxious stimulus [8]. A person has many condition /sicknesses of the body but not all causing pain. A physician can diagnose a disease to very great extent on the different qualities of pain [9].

Description of pain receptors and stimuli

CNS having different type of receptor for carry information from different part of the body to CNS, these receptors are called sensory receptors. A sensory receptor defined as it is a biological transducer which can convert various form of energy into action potential in sensory nerves to which they are connected. Receptors for pain are also sensory in nature and these are free nerve endings in different part of body. These do not have any obvious special structure in it[10]. These pain receptors also known as Nociceptors. They are widespread in the superficial layers of the skin, as well as in certain internal tissues, such as the periosteum, the arterial walls, the joint surfaces, and the falx and tentorium in the cranial vault. Most other deep tissues are only sparsely supplied with pain endings [9].

For conduction of pain sensation special pain fibres works which are A-delta & c-fibres. Type Aδ fibre is well-known as the thermal and mechanical nociceptors that are also the smallest myelinated nerves and have a relatively fast conduction velocity of 30 m/s. The diameter of Aδ-fibres is about 2–5 µm, and is responsive towards short-lasting and pricking pain. Group C nerve fibres are unmyelinated with less than 2 µm in diameter and have a relatively slow conduction velocity of approximately 2 µm/s. These fibres are mainly nociceptive in function, carrying the sensory information and assembling around 70% of the afferent's nociceptive information, which then enters the spinal cord. In terms of nociception, C-fibres nociceptors are polymodal, which are activated by thermal, mechanical and chemical stimuli. The activation of C-fibres is from poorly localized stimuli, such as burning sensation of the skin [8]. Three types of stimuli excite pain receptors i.e., mechanical, thermal and chemical. In general, fast pain is elicited by the mechanical and thermal types of stimuli, whereas slow pain can be elicited by all three types. After a tissue injury some chemical secreted from the injury site these are called neurotransmitter which may enhance the sensitivity of pain by free nerve endings like; bradykinin, serotonin, histamine, potassium ions, acids, acetylcholine, prostaglandin, and substance P [9]. "Glutamate & substance P are the neurotransmitters secreted by pain nerve endings." Aδ afferent fibre which transmits impulses of fast pain secrete Glutamate. The C type fibres which impulses of slow pain secrete substance P". Due to tissue damage in local area increase potassium ion concentration or proteolytic enzyme that directly attack the nerve endings and excite pain [11].

Types of pain

Typically, pain can be classified into three types-nociceptive, neuropathic and inflammatory pain, based on three characteristics, such as symptoms, mechanisms and syndromes.

Nociceptive: Nociceptive pain is caused by any injury to body tissues, for example, a cut, burn or fracture (broken bone). Postoperative pain and cancer pain are other forms of nociceptive pain. This type of pain can be aching, sharp or throbbing. Nociceptive pain can be constant or intermittent and may be worsened by movement or by coughing, depending on the area it originates from [12]. The major nociceptive pain can be categorized into two types including visceral somatic pain (which is further classified into two kinds: deep somatic and superficial pain). Both the Aδ- and C-fibres are mostly found in superficial organs, such as the skin, whereas other deep somatic structures, such as muscles and joints, are mainly supplied with C-fibers. Aδ-fibres are activated under thermal or mechanical stimuli and result in a short-lasting-pricking type of pain sensation. However, the activation of C-fibers is stimulated by thermal, mechanical or chemical stimuli, which often results in poor localization and dull pain sensation [8].

Neuropathic Pain: Neuropathic pain is commonly described as a nerve injury or nerve impairment and is often associated with allodynia. Allodynia is a central pain sensitization that is a result of repetitive non-painful stimulation of the receptors. This condition can be described as "pathologic" pain, because neuropathic pain actually serves no purpose in terms of defence system for our body, and the pain could be in the form of continuous sensation or episodic incidents. The major causes of this type of pain could be primarily due to inflammation or metabolic diseases, such as diabetes, trauma, toxins, tumours, primary neurological diseases and herpes zoster infection. The central sensitization plays a rather important role in this process [8].

Inflammatory Pain: Inflammation may lead to three major ratings: hyperalgesia, allodynia and sympathetic maintained pain. An inflammation can also induce mast cell degranulation, which results release of 5-HT from the circulating platelet. The cardinal signs of inflammation include the hot inflamed site due to increase in blood flow towards the region, redness, and swelling due to vascular permeability pain caused by the activation and sensitization of primary afferent neurons and lasting loss of function. The localized inflammatory rating then induces the release of free arachidonic acid (AA) from the phospholipids, which are converted into prostaglandins (PG), which are pain producing substance. Pain from inflammation can be further classified into two types: chronic and acute pain. Acute pain is normally intense and occurs for a short period of time, which is initiated as a rating to harmful stimuli that are normally mediated by the Aδ-fibres. Chronic pain, lasts beyond the expected period of healing, which is typically mediated by C-fibers [13].

Psychogenic Pain: This type of pain is caused or worsened by psychological factors. Often the pain has a physical cause, but the degree of pain and disability are out of

proportion to what would be experienced by most people with a similar disorder. This does not mean that the pain is not real, even if a physical cause cannot be found. Any kind of pain can be complicated by psychological factors [12]. Psychogenic pain is physical pain that is caused, increased, or prolonged by mental, emotional, or behavioural factors. Headache, back pain, or stomach pain are some of the most common types of psychogenic pain. It may occur, rarely, in persons with a mental disorder, but more commonly it accompanies or is induced by social rejection, broken heart, grief, lovesickness, or other such emotional events [14].

Pathophysiology of pain

The sensation of pain is associated with the activation of the receptors in the primary afferent fibres, which is inclusive of the unmyelinated C-fibre and myelinated Aδ fibre. Both nociceptors remain silent during homeostasis in the absence of pain and are activated when there is a potential of noxious stimulus. The perception of a series of sensory events is required for the brain in order to detect pain and produce a rating towards the threat. There are generally three main stages in the perception of pain. The first stage is pain sensitivity, followed by the second stage where the signals are transmitted from the periphery to the dorsal horn (DH), which is located in the spinal cord via the peripheral nervous system (PNS). Lastly, the third stage is to perform the transmission of the signals to the higher brain via the central nervous system (CNS). Typically, there are two routes for signal transmissions to be conducted: ascending and descending pathways. The pathway that goes upward carrying sensory information from the body via the spinal cord towards the brain is defined as the ascending pathway, whereas the nerves that goes downward from the brain to the reflex organs via the spinal cord is known as the descending pathway. Primarily, both the CNS and PNS are involved in the mechanism and pathways of all variations of pain perception. The PNS comprises nerves and ganglia that are located outside the brain and spinal cord, mainly functioning to connect the CNS to organs and limbs in our body. On the other hand, the CNS is composed of the spinal cord and the brain, which is mainly responsible for integrating and interpreting the information sent from the PNS, and subsequently coordinating all the activities in our bodies, before sending rating towards the effector organs. Fundamentally, the basic pain mechanism undergoes three events—transduction, transmission and modulation when there is a presence of noxious stimuli. For instance, transduction occurs along the nociceptive pathway following such order: (1) stimulus events are converted to chemical tissue events; (2) chemical tissue and synaptic cleft events are then changed into electrical events in the neurons; and (3) electrical events in the neurons are transduced as chemical events at the synapses. After the completion of transduction, the following mechanism would be transmission. It takes place by transmitting the electrical events along the neuronal pathways, while neurotransmitters in the synaptic cleft transmit information from a post-synaptic terminal of one cell to a pre-synaptic terminal of another. All these lead to one end result, and the pathway of pain has been initiated and completed, thus allowing us to feel the painful sensation triggered by the stimulus [15].

Pain Pathway

The sensation of pain that is experienced arrives in the central nervous system by means of two pathways:

1) A sensory discriminative system that encodes the capacity to analyse the nature (for example, burning or pricking), location, intensity, and duration of nociceptive stimulation, subserved by a lateral phylogenically newer system, and
2) An affective-motivational component that gives rise to the unpleasant character of painful sensation, subserved by a medial phylogenically older and more primitive system. These two pathways are in parallel with each other, following the classic three-neuron spinothalamic pathway [16].

Literature Review

The words “Pain” and “Suffering” have often been used synonymously, but the experience of suffering has been differentiated from pain. Suffering has been defined as indulging the experience of pain but as also including vulnerability, dehumanization, a lost sense of self, blocked coping efforts, lack of control over time and space, and an inability to find meaning or purpose in the painful experience [17]. According to Manheim pain is “An unpleasant emotional experience usually initiated by noxious stimulus and transmitted over a specialized neural network to the central nervous system where it is interpreted as such.” [18] In Greek word, pain means penalty. Plato said that pain arises from within the body and indicating that pain is more of an emotional experience. In recent times, the concept of pain has evolved from one dimensional to a multi-dimensional entity involving sensory, cognitive, motivational, and affective qualities. Pain is always subjective and every individual use this word through their previous experience related to the injury. Pain is an unpleasant feeling that is conveyed to the brain by sensory neurons [19].

The discomfort signals actual or potential injury to the body. However, pain is more than a sensation, or the physical awa reness of pain; it also includes perception, the subjective int erpretation of the discomfort. Perception gives information on the pain's location, intensity, and something about its nat ure. The various conscious and unconscious ratings to both s ensation and perception, including the emotional rating, add further definition to the overall concept of pain [16]. The experience of pain is different for every person, and there are various ways to feel and describe pain. This variation can, in some cases, make it challenging to define and treat pain. Pain can be short- or long-term and stay in one place or spread around the body [20]. The main function of the sensory system in our body is to guard and keep up pain homeostasis. It does this by identifying, localizing, and recognizing the tissue damaging processes. In view of the fact that different diseases produce distinctive patterns of tissue damage. The location, the time course, quality, and tenderness provide important clues for diagnosis, which are used as one of the best hints to evaluate the rating to treatment. Once the information is collected, physician can easily provide immediate and successful pain relief to the patient [21]. According to *Ibn Rushd* in his book *Kitabul Kulliyat,* bad feeling of sensory system is called pain which is due to sue *Mizaj har maddi* or due to sue *Mizaj barid maddi* [22]. *Ali Ibne Abbas Majusi* Said *Waja* means pain, change from its physical condition to unphysical condition and this change occur abruptly. Pain decreases strength of body and stops organs from their special functions [23].

Ibn-e-Sina classifies pain into 15 types and relates each type

to cause. He uses the word *Waja*' (hurt) as a general name for pain. However, he also uses Alam (pain) interchangeably with *Waja*' to describe how the patient feels. *Ibn-e-Sina* defined *Waja*' as 'one of un-natural (abnormal) conditions that affect the body' and that it is a 'feeling of incongruity'. *Ibn-e-Sina* subscribed to *Jalinoos*'s description of temperaments (physical condition of organs: hot or cold and dry or wet) and humours (blood, yellow bile, black bile and phlegm).

Ibn-e-Sina grouped *Waja*' into two broad categories. The first category describes *Waja*' according to sudden changes in temperament ea., Sue *Mizaj Mukhtalif* (abrupt in temperament). He stated 'if the existing organ's temperament is changed to the contrary, becomes hotter or cooler, pain would be felt. The second category describes *Tafarruqe Ittesal* (breach in continuity) 'interruptions in continuity' which is a concept described by *Jalinoos* as 'alterations' that break, cut, stretch or abrade [24].

Ibn-e-Sina also indicates that pain may persist even if the original stimulus had disappeared. He classified this pain as 'not true pain' and suggested that doctors should not attempt to treat it because the cause (i.e., the stimulus) 'does not exist'. This is consistent with modern pain theory which recognises that pain can often occur in the absence of injury which also called as psychogenic pain [25].

The *Sue-Mizaj* Mukhtalif (abrupt in temperament) may be *sada* (simple) or *maddi* (humoral).

1. *Sue Mizaj Maddi* (abnormal temperament with humoural involvement) it is an abnormal temperament which is associated with the substance or matter and it is further categorised into two types.
   - *Sue Mizaj har Maddi* (abnormal hot temperament with humoural involvement)
   - *Sue Mizaj barid Maddi* (abnormal cold temperament with humoural involvement)
2. *Sue Mizaj Ghair Maddi* (simple temperament) It is an abnormal temperament caused due to derangement of two basic *kaifiyaat* which may be hot or cold [27].

***Tafarruqe Ittesal* (breach in continuity)** *Tafarruqe ittesal* is disruption or breach in continuity which produces *Waja/ ahsase manfi* (unpleasant sensation). *Jalinoos*'s theory of pain is purely based on *tafarruqe ittesal* (loss of continuity). He stated that any *sue Mizaj* whether hot or cold causes pain by breaking continuity of a part. The breach in the continuity may be developed by some external and internal causes. The external causes are stretch, cut, burning, crushing, pricking, tearing which directly produces *tafarruqe ittesal* while the internal causes are *khilt-e-laze* (irritant matter), *khilt-e-akkal* (corrosive humours), *ghaleez riyah* (viscous pneuma), *ghaleez khilt* (viscous humours).

Khilte-e-laze (irritant humours) causes irritation and inflammation at the site of contact or accruement. *Akkal khilt* (corrosive humours) causes ulceration of the tissues due to their strong caustic and ulcerative properties. *Rehi madda* (Gaseous substance) produces discontinuity in two ways

- Localised accruement of *Rehi madda* (Gaseous substance) which produces distension in the organ cavity such as *Nafkhatul maida* leads to discontinuity or disruption in inner surface of an organ.
- Penetration of *Rehi madda* (Gaseous substance) in the organ layers and by separating them causes pain such as *Qoolanj Rehi.*

The *Ghaleez mawad* (Vitiated matters) cause discontinuity either by their excess quantity or acrid/vitiated quality. Quantitatively vitiated humours cause tension or stress while qualitatively they produce irritation or ulceration in organs and sometimes together causes pain [26].

Unani system of medicine is based on philosophy and it is holistic in approach. Kaifiy*āt-e-Arba'a* is one of the most important and primary concept in the system of Unani Medicine. *Kaifiyāt-i-Arba'a* refers to the four primary qualities of matter which are perceived by *Ḥiss-i-Lamisa* (touch and tactile sensation), that is heat *(Ḥarārat),* cold *(Burūdat),* moisture *(Ruṭūbat),* and dryness *(Yubūsat). Ibn-e-Sina* (980-1037AD) says that since the prime qualities of *Arkān-e-Arba'a* are four, so in all the things *Mizaj* (Temperament) are produced by these power, however the physical

change and variations in all the bodies are accomplished by *Kaifiyāt-e-Arba 'a.*

Amongst the *Kaifiyāt-e-Arba'a* two are active (heat and cold) and two are passive (moist and dry). All the natural changes are always the work of these *Kaifiyāt-e-Arba'a* .When the heat and cold are masters into the matter then they generate a thing. The natural changes are introduced by these powers into the matter underlying a given thing when they are in a certain ratio to that matter which is the passive qualities that is moist and dry [27].

According to Unani literature every *Mizaj* has different level of sensitivity as individual of *SAFRAWI Mizaj* will have highest sensitivity level and individual of *BALGHAMI Mizaj* will have least sensitivity level and individuals of *DAMWI & SAUDAWI* will have in between sensitivity levels. As *Damwi a*nd *Safrawi Mizaj* individual are consider as *Haar Mizaj* and *Saudawi* and *Balghami Mizaj* individual having *Barid Mizaj*, so hypersensitivity will be high in Hot temperament and hyposensitivity sense in Cold temperament e.g., certain people are quickly affected by cold air and the winter season, while others are not affected by them but affected by hot things [28].

Pain/ waja is a type of sensitivity which affects human body, so PRI will be different in individuals of different *Mizaj*, highest in Hot *Mizaj* and lowest in cold *Mizaj*. There will be difference in PRI according to Sex also.

Aims and Objectives: Study of pain rating index in different persons of either gender with reference to different *Mizaj* (body type according to Unani system of medicine) to establish a relationship between them.

Material and Method

It is an observation correlative study carried out in the department of Physiology of Ayurvedic & Unani Tibbia College & Hospital, New Delhi, India. Total 60 individual with age group from 40 to up to 70 were enrolled in the study. An informed consent form given to every individual to go through the details and sign that consent form. Identification of *Mizaj* was done with the help of temperament assessment proforma generated by Central Council for Research in Unani Medicine (CCRUM). Annexure-I. Pain rating index (PRI) for pain assessment of each individual is evaluated with MC Gill Pain Questionnaire, Annexure-II. We did in person interview of outpatient during daily OPD's and in person interview of admitted patient during daily round at bedside, verbally

asked the question about which type of pain they were feeling and marked the points as mentioned in questionnaire after that we added all points and got total PRI.

Inclusion Criteria: Persons of both sex suffering from different type of pain between age group 40 to >70 years.

Exclusion Criteria

- Person with age below 40 years
- Alcoholics
- Smokers and tobacco users
- Pregnancy

Investigations

- Identification of *Mizaj* by CCRUM *Mizaj* assessment proforma based on Ajnas-e-Ashra and formulated by Central Council for Research in Unani Medicine (CCRUM), Ministry of AYUSH, New Delhi.
- Evaluation of PRI through McGill Questionnaire Proforma

Observation and Results

Table 1: Total number OGF volunteer according to Mizaj and gender

Mizaj	Age Group 40 to >70		Total
	Male	Female	
Hot	20	10	30
Cold	10	20	30

Table 2: Total of PRI according to age group and Mizaj

Mizaj	Age Group 40 to >70		Total
	Male	Female	
Hot	578	318	896
Cold	249	507	756

One-way ANOVA test is applied to test the significance of the difference in results between mean PRI value in different *Mizaj* & gender and the following data is obtained.

Table-3

SOURCES	SUM OF SQUARE	DEGRE OF FREEDOM	MEAN SQUARE	F-STAT	P VALUE
Between GRUOP	384.0833	3	128.02	6.745	0.0006
Within GROUP	1062.847	56	18.97	-	-
Total	1446.929	59	-	-	-

DISTRIBUTION OF MEAN ± STANDARD DEVIATION OF MEAN PRI VALUE IN HOT (*DAMWI* & *SAFRAWI*) AND COLD (*BALGHAMI* & *SAUDAWI*) *MIZAJ*

TABLE -4

MIZAJ	GENDER	PRI (MEAN±SD)
HOT	MALE	28.9±3.91
COLD	MALE	24.9±3.28
HOT	FEMALE	31.8±7.34
COLD	FEMALE	25.35±3.15

GRAPHICAL DISTRIBUTION OF MEAN ± STANDARD DEVIATION OF MEAN PRI VALUE IN HOT (*DAMWI* & *SAFRAWI*) AND COLD (*BALGHAMI* & *SAUDAWI*) *MIZAJ*

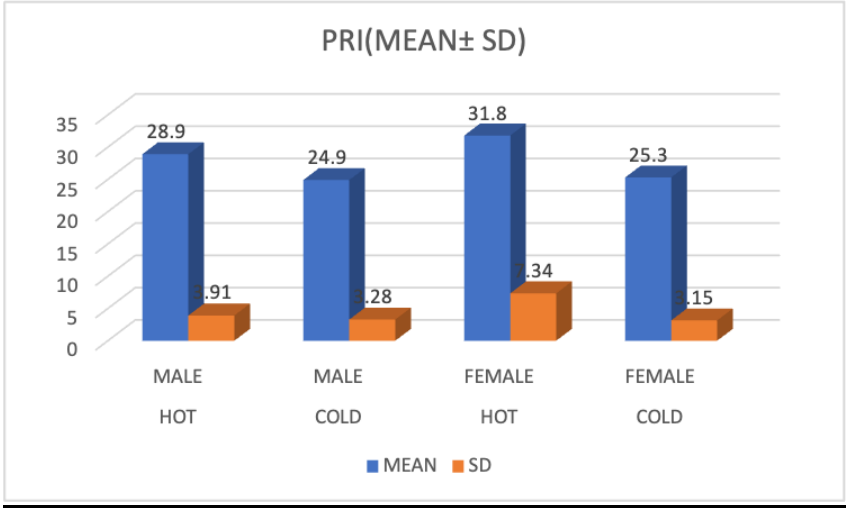

Fig 1: PRI Mean

Discussion and Conclusion

After taking history of 60 patients of different *Mizaj* & Gender the results are almost according to our hypothesis. Hot *Mizaj* individuals' group has highest PRI Mean and cold *Mizaj* individuals' group has lowest PRI Mean. There is some difference according to sex in same *Mizaj* individuals' group because characteristics of *Mizaj* are more prominent in Female than Male. It means hotness of *mizaj* increases sensitivity more in Female and coldness decreases sensitivity more in Female than male. As there is difference in PRI marked seen in the graph.

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