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Review Article

## Overcoming Pain: An Exploration of Analgesia in Ibn Sina's Al-Qanoon Fil Tibb

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### ABSTRACT

Ibn Sina (980-1037 AD), latinized as Avicenna was a Persian scholar, physician, scientist and medical writer whose works had a lasting influence on medical education for more than seven centuries. He is known to have authored more than 400 books, of which many could not be preserved. His most famous treatise is *Al-Qanoon Fil Tibb* (The Law in Medicine) which is a medical encyclopedia in five volumes. Pain is described in the first volume, alongwith its clinical features, causes and management. Pain is mentioned by the name of *waja'* (hurt) and described as a feeling contrary to the body. He described fifteen types of pain based on their causative factors and differentiated them on their clinical presentation, for instance, *waja'-i-Mukassir* (breaking pain), *waja'-i-I'iyāi* (fatigue pain), *waja'-i-Ḍarabāni* (throbbing pain) etc. For their management, he has prescribed different classes of drugs which act through diverse routes. *Mukhaddir* (narcotic or anaesthetic) are used for symptom relief, *murkhi* (relaxant) are advised when there is pent-up matter to help in its resolution, *muḥallil-i-waram* (anti-inflammatory) drugs are prescribed for inflammatory pains and *mus'hil* (purgative) drugs are prescribed if the morbid matter has to be excreted through intestines. In addition, an account of other effective regiems such as cupping, massage, music therapy and use of exhilarants is also described in *Al-Qanoon*.

**Keywords:** *Waja'*, Ibn Sina, Pain, *Su-i-mizāj*, *Muḥallil-i-waram*, Narcotic, Unani, Al Qanoon

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### Introduction

Ali al-Ḥusain Ibn Abdullah Ibn Sina, latinized in the western world as Avicenna, was a legendary scholar, scientist, physician and philosopher who lived in the tenth and eleventh centuries and is undoubtedly one of the most influential medical writers of all times; whose authority on Islamic and European medicine remained unchallenged for more than seven centuries. He was famously referred to as *Sheikh-ur Raees*, meaning 'the master elder' by his contemporaries. <sup>1</sup> In the western world, he is referred to as the 'prince of physicians' and his supremacy is well-acknowledged. It is established that in some universities, his works were used for teaching in medical universities up to as late as the nineteenth century. <sup>2</sup>

Ibn Sina was born in 980 AD in the city of Afshaneh near Bukhara in northeast of old Persia, and died at the age of 57 in 1037 AD in Hamadan in the west of Iran. He was an

extraordinarily gifted child who accomplished memorization of the *Qur'ān*, gained proficiency in Arabic language and studied classical literature of his time, all by the age of ten. In the following years he studied Islamic jurisprudence, astronomy, *mantiq* (logic) and *falsafa* (philosophy). Not surprisingly, his medical knowledge is dominated by logic and concepts. At age thirteen, he developed an interest in medical sciences and gained popularity in the country by eighteen years of age. At such a tender age, he was summoned to treat the ruler of Bukhara, Sultan Nuh Ibn Mansour, whose recovery made him a celebrated physician and provided him access to the royal library where he could quench his thirst for knowledge and expand his horizons. <sup>2</sup>

It is speculated that Ibn Sina wrote about 450 books in his entire lifetime on the subjects of medicine astronomy, theology, geometry, art and philosophy; of which only 250 survived. *Al-Qanoon fil Tibb* (The Law in Medicine), latinized

in the western world as 'The Canon', is the masterpiece of Ibn Sina completed between 1020-1025 AD<sup>3</sup>. It is a five volume medical encyclopedia containing one million words which summarized the previous information of Arabic medicine and also included the personal observations and experiences of Ibn Sina.<sup>2</sup> *Al Qanoon* was originally written in Arabic which was the *lingua franca* of the time.<sup>4</sup> It was translated into Latin in the late 12<sup>th</sup> century by Gerard of Cremona who named his translated version as '*Canon Medicinæ*' which was the first ever translation of the *Qanoon*. The translated version was re-printed and published over 40 times in Europe upto the 16<sup>th</sup> century, and continued to be taught in European medical colleges for centuries.<sup>5</sup> Each volume of the *Qanoon* is named as 'book', divided as under:

- The first book contains a description of general concept of medicine, *umūr-i-tabī'iyah* (basic principles), *asbāb-i-sitta qarūriyah* (six essential factors), anatomy and physiology, causes and symptoms of diseases, diagnostic principles and general therapeutics.
- The second book contains a description of herbal, animal and mineral drugs in alphabetical order.
- The third book contains an account of diseases and their treatments, arranged in system-wise chapters.
- The fourth book contains an account of special conditions including fevers, cosmetology, wounds, dislocations, toxins, animal bites etc.
- The last book is a *qarābādīn* (pharmacopoeia) which contains a description of more than 650 compound formulations.<sup>1</sup>

### Description of pain in *Al-Qanoon Fil Tibb*

The first book of *Al-Qanoon* is divided into two *ḥiṣṣa* (parts), which are further subdivided into *fan* (art/ technique), which are subdivided into *ta'lim* (knowledge) and each *ta'lim* is divided into *faṣl* (articles/ chapters). The 21<sup>st</sup> to 26<sup>th</sup> *faṣl* in the second *ta'lim* of second *fan* in *ḥiṣṣa awwal* (first part) of the first book contains a description of pain, its causes, differential diagnosis and clinical aspects. The 30<sup>th</sup> *faṣl* of the fourth *fan* in the same part is dedicated to the management of pain.

### Concept and causation of pain in *Al-Qanoon*

Pain is mentioned by the term of *waja'* (pain) and *alam* (pain perception) interchangeably in the *Qanoon*. In old Arabic, *waja'* was also used for presence of disease. In modern Arabic, the term *alam* is used as the official term for pain. (6) He defined *waja'* as 'a feeling of incongruity which is perceived by sensory route', something that is in conflict with the body. He stated that the causation of pain is broadly divided into two types of factors-(i) those which lead to *su-i-mizāj mukhtalif* (temperament opposed to normal), or (ii) *taffaruq-i-itteṣāl* (breach in continuity). This was opposed to Galen's concept of pain who stated that pain can only be caused if there is *taffaruq-i-itteṣāl*. Ibn Sina stated that not all stimuli lead to breach in continuity of tissues, and some cause pain only due to opposing temperaments. Therefore, it is possible that some pain may be felt even when the cause has been eliminated. About such pain, Ibn Sina has maintained that no treatment should be attempted and the body should be allowed to recover itself.<sup>7</sup> This is also in consistence with recent researches where it is mentioned that some types of pain may persist even in the absence of any detectable tissue damage.<sup>8</sup>

About *su-i-mizāj*, he elaborated that it may be of two types, *su-i-mizāj mukhtalif*, that which is opposite to the normal *mizāj*; or *su-i-mizāj muttafiq*, that which is in accordance with

the normal temperament. *Muttafiq* is the Arabic term for 'agreement'. The *su-i-mizāj mukhtalif* is perceived as a foreign temperament by the *quwwat-i-ḥis* (sensory faculty), and the feeling of this change in known as *alam* (pain perception). On the other hand, *su-i-mizāj muttafiq* is the one which destroys the original temperament, and the unhealthy temperament supervenes, hence there is not feeling of contrariety and no pain is felt. It is explained by the example that a person suffering from *ḥumma-i-diq* (hectic fever) does not feel his febrile condition as much as the patient suffering from *ḥumma-i-yawm* (one-day fever), because the *ḥarārat* (hotness) of *diq* is persistent and is incorporated into the *jawhar* (nature) of organs. This is also explained in terms of the use of hot water in winters. Initially, the body perceives the water as 'hot', but when used for some time, the foreign feeling disappears. At some instant, when the body has gained enough heat, the person using hot water on his body starts feeling uncomfortable.<sup>9</sup> It has been established by recent studies that a high rate of temperature change increases the pain threshold, but the threshold decreases sharply with the duration, and the time required for pain detection is dependent on the baseline temperature.<sup>10</sup> If the body is not allowed to cool through natural mechanisms, it may result in adverse effects.<sup>11</sup> Also, TrpV1-expressing neurons have been identified in the trigeminal and dorsal root ganglia of mice which are selective nociceptors for somatosensory coding of thermal stimuli.<sup>12</sup>

He also speculated on the neurological causes of pain, that sometimes pain be perceived even when the offending cause has been removed; and also that sometimes pain be felt over an entire region equally, while the injury is localized,<sup>7</sup> now known to be caused due to sensitization of central pain pathways.<sup>13</sup> Further, he states that pain is perceived more when the change in temperament or the loss of continuity occurs suddenly, in case of a gradual change, it is not necessary that the change may be perceived, and whether the sensation will be painful.<sup>7</sup> This may be explained by the mechanism of endogenous pain modulation and sensitization of nerves after repeated stimuli.<sup>14</sup>

### Types of pain

Ibn Sina stated that all kinds of pain cause loss of *quwa* (powers) and disruption of normal functions.<sup>7</sup> It also leads to dispersion of *rūḥ* (penuma) and weakening of vital forces.<sup>15</sup> Ibn Sina described fifteen different types of pain based on the causes. The highlight of this classification is that the causes have been put in direct correlation with the clinical presentation, and named accordingly. So that a simple mention of the type of pain leads to a provisional diagnosis.<sup>7</sup> It was also observed that the nature of different types of pain described by Avicenna is strikingly similar to the types of pains described in currently used questionnaires;<sup>16</sup> however these are based on clinical perception while Ibn Sina's classification is based on the etiology.

The first is *waja'-i-ḥakāk* (Itching pain), the pain in which a scratching sensation is felt, and is caused due to *showr* (acid) and sharp humors. *Waja'-i-Khashin* (rough/ irritating pain) is caused due to *khushūnat* (roughness or harshness) of humors. *Waja'-i-Nākhis* (stretching pain) is caused due to anything which causes stretching of membranes in transverse direction. The pain may be felt uniformly over the organ or it may be non-uniform. *Waja'-i-Mumaddid* (compressing pain) is caused by humors or injury which cause tension on the nerves or muscles; it may sometimes be caused due to external compression. *Waja'-i-Munaffikh* (tearing pain) is characterized by distension in membranes or muscles due to the presence of morbid matter. *Waja'-i-Mukassir* (breaking pain) may be caused by an injury, morbid

humors or due to intense cold which lead to discontinuity between muscles and their membranes. *Waja'-i-Rikhw* (loose pain) is caused by any matter which causes distension in muscles but not the ligaments and tendons, it is named so because the muscles are softer than the ligaments and tendons. *Waja'-i-Thāqib* (boring pain), the pain which feels like being penetrated. It is caused due to viscous humors or gases which are retained in structures like colon and continuously cause a feeling of penetration. In *waja'-i-misallī* (piercing pain) the patient feels like something is held within him. Its cause is similar to *waja'-i-thāqib*, except that the humors do not diffuse even after causing penetration. *Waja'-i-Ḍarabānī* (throbbing pain) is one in which throbbing sensation is felt. It is caused by some hot swelling which affects the adjoining sensitive organs, and the arterial pulsating movements lead to pain. *Waja'-i-Thaqīl* (heavy pain) is felt due to swelling in organs having less sensation like kidneys, spleen and lungs, the swelling weighs down due to gravity and causes a feeling of heaviness due to stretching of fascia. It may also be caused in case of destruction of sensory nerves by diseases such as cancers. *Waja'-i-I'iyāī* (fatigue pain) is the pain caused due to physical exertion. It may be caused by (i) excessive activity, called *ta'bī* (labour fatigue) (ii) a humor which causes distension, known as *tamaddudī* (tension fatigue) or (iii) gases, called *nāfikh* (flatulent fatigue). It may sometimes be caused due to a combination of any of these types and produce various clinical presentations, one of which is *waramī* (inflammatory) caused a combination of *tamaddudī* and *qurūhī* (ulcerative) causes. *Waja'-i-Lādhi'* (irritating pain) is caused by humors having pungent property.<sup>7,6,15</sup>

Overall, the alleviation of pain is caused by removal of cause, usually by evacuation of humors, or by *tartīb* (increasing moisture), or inducing sleep, or use of *musakkirāt* (narcotics), or by *barūdat* (cold) which may cause loss of sensation. However, Ibn Sina stated, the real treatment is the first one.<sup>15</sup>

### Drugs with analgesic activity

In accordance with the causation of pain, Ibn Sina has listed drugs in four broad categories for use as analgesics. He says that *mukhaddir* (narcotic or anaesthetic) drugs are usually effective in all kinds of pain as they cause relief of pain by suppression of sensation. The strongest narcotic mentioned by him was *afyūn* (opium),<sup>7</sup> and even today, opioids remain the best-known analgesics, although they are used selectively due to the adverse effects.<sup>17</sup> Ibn Sina advocated cautious use of narcotics, and said that they were best used in compound formulations which may reduce their strength and toxicity. In some cases, he strongly advised against the use of analgesics, such as in acute colic, as it may aggravate the pain due to its *barūdat*. Other *mukhaddir* drugs are *tuffāḥ* (*Malus pumila* Mill.), poppy seeds, *ajwain khorāsānī* (*Hyoscyamus niger* Linn.), *shūkrān* (*Conium maculatum* Linn.) and *mako siyāh* (*Physalis alkekengi* Linn.). *Tukhm kāhū* (*Lactuca sativa* Linn.) and ice may also act as *mukhaddir*.<sup>15</sup>

*Murkhī* (relaxant) drugs ease the tissues and facilitate *taḥlīl* (resolution) due which leads to health. Examples are *tukhm shibt* (*Anethum sowa* Kurz. seeds), *tukhm katān* (*Linum usitatissimum* Linn. seeds), *nākhūna* (*Trigonella uncata* Boiss and Noe. seeds), *bābūna* (*Matricaria chamomilla* Linn. seeds), *tukhm karaḥ* (*Apium graveolens* Linn. seeds), *khaṭmī* (*Althaea officinalis* Linn.), *zūfā* (*Hyssopus officinalis* Linn.) etc. *Muḥallil-i-waram* (anti-inflammatory) drugs are also included in this category. Drugs which are *mus'hil* (purgatives) or *mutafrigha* (causing excretion by any path) also help in relief of pain by removal of the causative agent.<sup>1</sup>

### Ilaj bit Tadbeer

Ibn Sina also described certain *tadābīr* (regimes) which could help in pain relief without much physiological interference. He advised to put the patient to sleep without use of medicines, as it could itself act as an analgesic. For *waja'-i-riḥī* (flatulent pain), he said it could be relieved by simple *naṭūl* (pouring) of hot water. However, it should always be ascertained if the pain is only flatulent and not associated with inflammation, as the latter will be aggravated by the heat. In some cases, the *naṭūl* can also aggravate the flatulent pain by expanding the retained gases, if they are not expelled. In this case, fomentation should be done with drugs which cause dryness of temperament, such as *bājra*. Pea flour boiled in vinegar and then dried is also useful for fomentation in such cases.<sup>7</sup>

*Hijāmah nāriya* (fire cupping) also has the effect of *takmīd* (fomentation), and according to him, relieves pain in just one or two sessions. Gentle massage is generally useful in all kinds of pain as it causes relaxation. He also advised the use of music, especially relaxing music which causes sleepiness as an effective pain-relief measure. Use of *mufarriḥāt* (exhilarants) has also been advised for pain relief.<sup>7</sup>

### Conclusion

A review of Ibn Sina's *Al-Qanoon Fil Tibb* reveals an unfathomable sea of information based on a clear scientific understanding. It is unimaginable that such rational information could have been presented without extensive research and experience. No wonder that the book remained the mainstay of modern medical education for many centuries and the drugs prescribed for pain relief, and their indications/ contraindications are accepted even today. The types of pain described by Ibn Sina closely match the clinical descriptions of pain in the highly accepted scientific questionnaires including the famous McGill Pain Questionnaire.<sup>16</sup> Drugs described for the treatment of pain are classified based on their actions as narcotics, relaxing, and those causing excretion of wastes, and clear guidelines are provided for the use of each of them. Opium, though described as the best analgesic, has been advised to be used with caution, preferably in lower doses or in compound form where its toxicity may be neutralized,<sup>9</sup> a truly modern concept.<sup>18</sup> He also advised on the use of exhilarants, sleep, music therapy and massage which remain important supportive forms of treatment in pain patients to this day.<sup>19</sup>

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