

NABḌ MURAKKAB: CAUSES AND ITS APPLICATION**Hasan H.^{1*}, Neha Siddiqui² and Ferasat Ali³**

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ABSTRACT

Pulse occupies a very significant role in diagnosing the state of a person, be it health or disease. There have been so many classical manuscripts written on pulse by Unani scholars which are of great clinical importance. There are several factors that provide the inherent pulse. These factors are the vital power of the heart itself, the elasticity of the artery, and the resistance, or urge, of the force of the pulse. These factors will not provide variation in the pulse, but together they are responsible for the normal pulse in any person. But there are a host of non-essential factors that may produce changes in the pulse such as as age, season, changing temperament, bathing, exercise etc. This

paper descriptively discuss the causes of pulse, types of pulse, *NabḌ Murakkab* (compound pulse) and its causes, effect of various factors on pulse as well as the application of all of the above as described by the Unani scholars.

KEYWORDS: Pulse, Unani, *NabḌ Murakkab*.

INTRODUCTION

Pulse has been a topic of great importance since antiquity and is described in almost every art of medicine including Unani system of medicine. Pulse is the most common measure of our existence; the one that differentiate living from the dead. It is one of the vital signs used to assess *Hālat Badan*, the others being respiratory rate, temperature and the blood pressure. *NabḌ* is equivalent to measuring the heart rate. Unani physicians included the examination of *NabḌ* among the classical indicators of disease along with the examination of *Bawl* and *Barāz*. In medicine, *NabḌ* depicts the tactile arterial palpation of the heartbeat by trained

fingertips. *Nabḍ* can be palpated in any place that allows an artery to be compressed near the surface of the body, like *Shiryān Subātī* (carotid artery) at the neck, *Shiryān Zindī A'la* (radial artery) at wrist, *Shiryān Fakhzi* (femoral artery) at the groin, *Shiryān Mabzi* (popliteal artery) behind the knee, *Shiryān Junubi Zahiri* (posterior tibial artery) near the ankle joint, and *Shiryān Zahiri-ul-Qadam* (dorsalis pedis artery) on foot.^[1]

Pulse lore is an ancient art which the Arabic physician inherited from the ancient Greeks. *Buqrāt* has some saying on *Nabḍ* but not to that extent. He described strong fast pulse in the most accurate fevers in *Epidemics IV* and in *On Nourishment*, he states that *Nabḍ* varies with age, and in health and disease. After *Buqrāt*, many Greek physicians wrote on *Nabḍ*. The Greek anatomist, *Herophilus* also described the quality, rate and rhythm of *Nabḍ*. *Rufus* and *Markellinos* wrote treatise on *Nabḍ*, which includes the description of double hammer pulse.^[2] *Galen* also highlighted the importance of feeling *Nabḍ* and taught that an intermittent pulse carried a poor prognosis and could be the indicator of sudden death. He wrote 18 books on the arterial pulse, providing elaborate description that influenced clinical practice into the 18th century. He fully elaborated the concept that heart is the source of heat, and blood vessels carried pneuma, the life sustaining spirit of the vital organs.^[3] *Al-Razi's Kitab Ikhtisar, Kitab al-Nabḍ al-Kabir li-Jālinūs* was a synopsis of *Jālinūs* major work on the pulse.^[2] Regarding *Nabḍ*, *Ibn Sīnā* says that *Nabḍ* is the movement of the vessels of pneuma which comprises expansion and contraction and purpose of these movements to temper pneuma with air and expel the waste material. He also says that *Nabḍ* is composed of two movements [Systole] and two rest [Diastole]. A beat comprises relaxation and contraction, then two rests between these two differing movements because it is impossible to immediately carry out a second movement after the ending of the first distance and action, and this is illustrated by natural science. It is definite that each successive beat has four parts, “two movements and two rests,” in this sequence: relaxation, rest, contraction, and rest.^[4] *Ibn Naḥīs* described *Nabḍ*, as *Ḥarakat Waḍ'iyya* of the artery which is formed by its contraction and expansion.^[5]

Asbāb Nabḍ (Causes of pulse): These are the causes that forms *Nabḍ* or produces new state in *Nabḍ* or maintains *Nabḍ* in its previous or original state. Factors governing the pulses are divided into *Asbāb Masika* and *Asbāb ghayr Masika* on the basis of their involvement in the formation of *Nabḍ*.^[6]

- ***Asbāb Masika (Retentive causes):*** These causes are also known as *Asbāb Muqawwima*. These are the general, essential and intrinsic causes which take part in the formation of the pulse. There are causes that are not part of the pulse health; these are either the essential causes, whose alteration changes the pulse, or unessential alternative causes.⁴ Pulse cannot exist without these factors. *Asbāb Māsika* are three: (a) *Quwwat Haywāniyya* (vital force in the heart), which creates the pulse (b) *‘Āla Nabḍ* (Instrument of the pulse) i.e, the pulsating vessel. (c) *Hajat Tarwīḥ* or *Tatfīḥ* (need for extinguishing). It requires a definite amount of extinction, and restricts the limit of heat in its intense, or extinguished or moderate (states).^[6]
- ***Asbāb Ghayr Māsika (Non-Retentive causes):*** These causes are also known as *Asbāb Ghayr Muqawwima* or *Asbāb Mughayyira*. These are the factors which do not take part in the formation of *Nabḍ* but any change in these factors ultimately alters the state of *Nabḍ* and because of which these are known as *Asbāb Mughayyira*. These are further divided into *Asbāb Lāzima* (Essential) and *Asbāb Ghayr Lāzima* (Alterative causes). *Asbāb Lāzima* are the factors that are necessary for *Nabḍ* although these are not required for its formation meaning these are not obligatory. Any change in them will definitely alters the state of *Nabḍ* and usually physiological changes occurs in *Nabḍ* due to variation in these factors. *Asbāb Ghayr Lāzima* includes the factors that are in opposition to *Ṭabī’at* (physis). Pathological changes occurs in *Nabḍ* due to variation in these factors. *Asbāb Lāzima* may be of two types.^[6]
- ***Ṭabai’ Umūr*** (Natural factors i.e. pertaining to the nature): like *Asbāb Sitta Ḍarūriyya*, Age (manhood, youth); temperature of air (hot seasons, hot localities), temperament.
- ***Ghayr Ṭabai’ Umūr*** (Non-natural factors); like *Asbāb Ghayr Ḍarūriyya*- Exposure to very hot atmosphere; use of hot baths; vigorous exercise or gymnastics, influence of food and wine; influence of calfacient medicines.

Determination of pulse: *Ibn Sīnā* mentioned ten parameters known as *Adilla al-Nabḍ* or *Ajnās al-Nabḍ* for the detection of *Nabḍ* which are as follows.^[7,8]

1. *Miqdār al-Inbisāṭ* (The Expansion)
2. *Kayfiya al-Qar’* (The Stroke)
3. *Zamāna i-Ḥarakat* (The frequency)
4. *Zamāna-i-Sukūn* (The pause)
5. *Qiwām- i-Āla* (The flexibility)

6. *Khalā-o-Imtilā* (The volume of the Pulse)
7. *Malmas* (The touch)
8. *Istawā 'o- Ikhtilāf* (The synchronicity)
9. *Nizām-o- 'Adm-i-Nizām* (rhythmic or arrhythmic)
10. *Wazn* (The Character)

Types of Nabḍ: *Nabḍ* has been classified in two; *Nabḍ Basīt* and *Nabḍ Murakkab*.

Nabḍ Basīt covers all the parameter described by *Ibn Sīnā* whereas *Nabḍ Murakkab* is the *Nabḍ* which has alteration in two or more parameters.^[7,8] Various types of *Nabḍ Murakkab* that has been described by Unani physicians along with their application, are as follows;

1. ***Nabḍ Ghazālī*** (Gazelle Pulse or Goat-leap pulse or *Pulsus gazellans*): It is the unequal pulse varying in one part. It is slow but later on becomes rapid. Expansion is interrupted and lasts for a longer duration than normal, remain at a fixed height, then quickly increases to full height. The second beat begins before the first one is completed. It is linked to deer, gazelle or goat leaping over a fence.^[4,9,10] When they reached the middle of leap the hind leg rise up higher as the front leg start to descend. It is commonly observed in pericarditis.^[11]
2. ***Nabḍ Mawjī*** (Wavy pulse, Undulatory pulse/ *Pulsus undosus*): The irregularity is in respect of thickness, smallness, height and breadth of the parts of the artery. Similarly, in this pulse the beat is too soon or too late. This type of pulse is soft but it is not very small; it has some breadth. It is like waves, which follow one another in orderly way and yet in the extent of rise and fall, and in swiftness and slowness.^[4,10] *Floyer* maintained that this type of pulse is the signal of excess blood or *ruh* or both. Even in lethargy, pulse is undose, great and slow.^[9]
3. ***Nabḍ Dūdī*** (Vermicular pulse or Creeping pulse): It is similar to the wavy pulse, but it is small and very regular. Its regularity causes it to be mistaken for a swift pulse though it is not so. *Nabḍ Dūdī* occurs when the artery moves slowly, and is but a little distended, and it represents the motion of a worm, who goes forward by testing and slow bending of itself, or lifting up; this is a very slow and small pulse. It is associated with failure of the circulation from cold.^[9]
4. ***Nabḍ Namī*** (Ant-like pulse or Formicant pulse or *Pulsus formicans*): It is smaller and still more regular than *Nabḍ Dūdī*. It differs from *Nabḍ Dūdī* in the great ease with which upward rise, anteposition of beat or postposition is perceived. Irregularity of breadth is hardly perceptible. *Ibn Sīnā* explains, this is the smallest, most feeble, and hurried of all

the pulses. *Floyer* conquers a formicant pulse is like the motion of an ant, who moves her feet off without going much forward; this pulse is the extreme weak, small, and frequent.^[9] *Gruner* explains in a note, "it is a weak form of vermicular pulse., and allied in character to the 'hectic' pulse." When heat has gotten out of hand and the fluids have been "evaporated away". This is extremely rapid and feels like an ant staggering along.^[12] It indicates heat driving off the fluids and, probably, impending death and occur due to weakness of peristaltic action.^[9,11]

5. ***Nabḍ Minshārī*** (Serrate pulse or Harsh pulse or *Pulsus serratus*): This pulse resembles the wavy pulse in inequality of the various parts, rise, breadth, ante position and post position. It differs, however, in being harder though the hardness is not uniform. Hence, *Nabḍ Minshārī* is swift, continuous and hard. Its part differs in size of expansion and in hardness and softness. It has a property of the quick pulse as well as the hard and the undose. "If the harshness be slight, it shows that the inflammation is mild; if more marked, it means that the case is severe and dangerous, with a danger of an empyema or tuberculous change". For some physician, *Nabḍ Minshārī* indicates pleurisy in particular "quick, frequent, vehement, hard, serrant."^[9]
6. ***Nabḍ Dhanab al-Fār*** (Mouse tail pulse): There is progressive inequality of the components, from decrease to increase, from increase to decrease. This may apply to several beats or only to one beat or only to a part of beat. This inequality is in respect of volume, or of slowness or of weakness. It is best felt after a hard day's work, especially in hot, humid weather.^[4,9] *Gruner* quoted that the artery feels large in the distal position and narrows until it is thin in the proximal position. It indicates exhaustion of the nervous system and loss of fluids. At this time it is a normal pulse. It is identical to the soft pulse except it indicates more exhaustion of the fluids.^[12] *Ibn Sīnā* explains that it is produced when the vital power is weak, as a person who ceases manual labor, or is resuming it after a rest. He described the chronic version, "If it is constant, it shows that the loss of power is greater. However, as long as the pulsation is mouse-tail in type (and the similar forms) it shows that there is some vitality left. But it is apt to pass on to the terminal mouse-tail, then to continuous mouse-tail, and finally end in the grave 'recurrent mouse-tail' or "swooning" pulse or *pulsus cauda reditiva* which indicates increasing drainage of energy from the body and would be characteristic in the cachexia of cancer.^[4,9] It is sign of malignancy and is caused by very weak life force.^[11]
7. ***Nabḍ Dhanab Misallī*** (Spindle shaped pulse or Recurrent pulse or *Pulsus reditiva*): This pulse is small in the distal position, large in the medial, and small in the proximal. It starts

from smallness and increases up to a certain limit and then it declines and comes back to the original position. It is like two mouse tail joined to each other at the base.^[4,9] *Ibn Sīnā* says that this indicates extreme debility or wasting from unresolved inflammation or any other cause.^[11]

8. ***Nabḍ Dhu'l Qar'atayn*** (Dicrotic pulse): Some of them regard it as single beat varying in anteposition and postposition while others regard it be a dual beat. The intermission between the two beats is not so much as to facilitate for a movement of contraction and then expansion. *Reuben Amber* writes, the finger strikes twice at each contraction of the heart; one lightly and one more forcibly. There is one heart beat for two arterial pulsations. This type of pulse is found in extra systoles. It indicates low arterial tension and is noted in fevers, in low states of the nervous system and sometimes in typhoid fever. It can also indicate organic affliction of the heart or large arteries and is sometimes found in very nervous dyspepsia, especially those who have indulged freely in narcotics and nervines.^[4,9,10,11]
9. ***Nabḍ Dhu'l Fatra*** (Intermittent pulse): In this pulse a pause appears when movement is expected.^[4]
10. ***Nabḍ Wāqi' fi'l Wasaṭ*** (Fading or falling pulse, Supernumerary pulse): In this pulse, an extra beats appears during the period of rest after the first beat has ended.^[4]
11. ***Nabḍ Mutashannij*** (Spasmodic pulse): *Gruner* quoted that *Nabḍ Mutashannij* suggests that the artery is being stretched and dragged and pulled by its extremities like a cord.^[12] This type of pulse is seen in convulsions.^[11]
12. ***Nabḍ Murta'ish*** (Tremulous pulse or *Pulsus tremulus*): *Ibn Sina* says that, in *Nabḍ Murta'ish*, the vital power is strong, the artery is hard, the resistance is great. Without these conditions it cannot arise. When the artery is hard there is a slight vibration or trill that reverberates after to stroke hits the wall.^[4,9,11]
13. ***Nabḍ Multawī*** (Twisted pulse or *Pulsus retortus*): This is a subtype of spasmodic pulse. This pulse is like a thread, which is twisted. Also, there is "an irregularity between the precession and the later parts of the pulsations both in position and in breath." These varieties (11-13) differ from one another in progress and delay of the beat in position and breadth.^[4]
14. ***Nabḍ Mutawātir*** (Cord like pulse or *Pulsus chordosus*): It is one the variety of the *Nabḍ Multawī*. It resembles *Nabḍ Multawī* with the difference that in the cord like pulse the movement of expansion is less conspicuous; similarly, the departure from the regularity of position of rise is less evident but tension is evident. *Ibn Sīnā* says that the two kinds of

pulse are really equally common, and equally liable to occur in 'dry' diseases” This type of pulse is seen in dry in temperament.^[4,9,11]

Note: Irregular pulse is also seen in atrial flutter with changing A-V block and in extreme degree of sinus arrhythmia. If irregularity is coming at a regular interval, which can be predicted, it is generally due to regular ectopic beats, Wenkebach's phenomenon or due to sinus arrhythmia.

Table 01: Some of the pulses and their causes.

Pulses	Causes
<i>Broad pulse</i>	Emptiness of the arteries, extreme softness of the artery.
<i>Weak pulse</i>	Insomnia, emaciation, bad humors, excessive exercise, movement of the humors, dispersion.
<i>Hard pulse</i>	Dryness of the arteries, great distension in the arteries, intense cold.
<i>Soft pulse</i>	Excessive moisture, diseases with moistening action.
<i>Irregular pulse</i>	Heaviness of food or humor, repletion of the arteries with blood, viscosity of blood, bad humour in the stomach, stress.
<i>Serrate pulse</i>	Flow of putrid, immature and cocted matter (all at the same time) into the artery, varying states of the artery in hardness and softness, inflammation in the nerve organs.
<i>Dicrotic pulse</i>	Great vitality and pressing 'need'.
<i>Mouse tail</i>	Weakness of vital power.
<i>Intermittent pulse</i>	Enfeebled vital power.
<i>Spasmodic pulse</i>	Irregular vital power, defective structure of artery.
<i>Tremulous pulse</i>	Strong power, hard artery.
<i>Wavy pulse</i>	Weak power, softness of artery.
<i>Vermicular pulse</i>	Extreme weakness causing sluggishness.
<i>Pulse with faulty rhythm</i>	Defect in the state (of the pulse) at the time of repose, defect in the state (of the pulse) at the time of activity.

FACTORS AFFECTING NABḌ

Effect of *Mākūlāt-o-Mashrūbāt* (dietetics) on *NabḌ*: *Mākūlāt-o-Mashrūbāt* change the characteristics of *NabḌ* according to their *Kammiyat* and *Kayfiyat*. Their action, by their quality means when they have excessive heating or cooling property, they alter *NabḌ* accordingly. Their action, by their quantity means that if they are moderate in quantity, the

pulse become larger, quicker and more frequent due to increase in power and heat. This effect persists for a considerable length of time. If the aliment is in great quantity, *Nabḍ* become unequal and irregular because the burden of food overcomes the power.^[4,10,12]

Effect of *Ḥarakat wa Sukūn Badanī* on *Nabḍ*: *Nabḍ* during sleep varies according to the stages of sleep and the state of digestion. At the beginning of sleep, the pulse is small and weak because the *Ḥarārat-e-Gharīziyya* then shrinks and moves inwards instead of expanding and moving to the surface. When digestion is complete during sleep, the pulse regains its strength. If the sleep continues the pulse again becomes weak because the innate heat is suppressed by extra fluids which are to be eliminated through different kinds of depletion only in waking state. When a sleeping person awakes in his natural way, the pulse slowly becomes large and rapid and returns to its natural state. But, when someone suddenly wakes due to an unexpected event; *Nabḍ* stop for a while because the energy is overthrown by the accidental cause. It becomes large, rapid, frequent and unequal tending to be unsteady.^[4]

Effect of *Riyāzat* (exercise) on *Nabḍ*: In the starting, *Nabḍ* becomes large and strong as long as *Riyāzat* remains moderate. This is because the *Ḥarārat Gharīziyya* increases and makes the *Nabḍ* strong. Also, *Nabḍ* becomes very quick and frequent during movement due to extreme necessity. If the *Riyāzat* is continued for long times or if it becomes very intense even for a short time, then *Nabḍ* loses its strength and becomes weak and small due to dispersion of *Ḥarārat Gharīziyya* towards the body surface. *Nabḍ* becomes ant like when *Riyāzat* continues for long time because of the weakness and more frequency.^[12,13]

Effect of *Ḥammām* (bathing) on *Nabḍ*: *Ḥammām* with hot water has, in the beginning, the same effect as that of energy and requirement. When the bath has brought about a great dispersal of energy, the pulse becomes weak and according to *Galen* the pulse is small, slow and infrequent. Hot water bath affects the pulse in two ways one if the cod reaches the interior part of the body then the pulse becomes weak, small, infrequent and slow. Second if it does not do so but aggregates the innate heat, the power increases and thus the pulse become somewhat large but quickness and frequency are decreased.^[4,10,12]

Effect of *Infi'ālāt Nafsāniyya* on *Nabḍ*: Anger stimulates the faculty strength and expands the "spirit" inneously, thus causing *Nabḍ* to be very large, fast, and frequent pulse should remain uniform because the reaction is consistent. Even when it is mixed with fear, then the

two states may be staggered in dominance. Similarly, if anger is associated with shyness, mental anguish, or a restraint from showing anger to another person, then *Nabḍ* would be unequal.^[4,10]

Ibn Sina described some specific pulses of specific diseases as follows-^[14]

Table 02: Specific pulses of specific diseases.

Diseases	Characteristics of pulse
Pneumonia	Weak, swift, soft and wavy
Endocarditis	Small, fast, infrequent
<i>Haiza</i> (Cholera)	Weak, irregular
<i>Istisqā</i> (Ascitis)	Small, weak and irregular
Urinary bladder inflammation	Weak
<i>Sarsām Hār</i>	Big, rapid, regular
<i>Fālij</i> (Paralysis)	Infrequent, slow
Facial palsy	Hard
Typhoid	Fast, soft, full
<i>Juzām</i> (Leprosy)	Small, weak and regular
<i>Baras̄</i> (Leukoderma)	Slow, soft and wider
Measles	Rapid
Anaemia	Fast and regular

CONCLUSION

As already stated above, pulse has a noteworthy role in analysis of the state of a person. It is remarkably accurate in allowing the physician to recognize the site, severity, and intensity of interior disease conditions. However, the basic texts on the pulse run into many volumes (the Chinese classic text on the pulse is in twenty-five volumes), and some formal personal instruction by an experienced Hakim would be necessary to verify one's impressions of the pulse. Nowadays, modern tools and techniques have made it easier to diagnose a particular condition. But the significance of diagnosing through pulse lies in the fact that this procedure is comparatively economical, easier, accurate, and provide instant insight of the condition. There is a lot of literature available in Unani with reference to pulse and diagnosis through pulse. The amalgamation of modern techniques with classical knowledge can lead to better and fast diagnosis, prognosis and even in differential diagnosis of the disease.

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