

A study of the concept of water in Susruta samhita

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Abstract

Water is well accepted to be the first priority daily requirement of the human society and also of the other living organisms. Even, if observed, it is seen that, the soil becomes fertile by water, the plants cannot grow without water, animals cannot live without water. The human and animal use water for external cleaning and drinking. Above that the human use it for cleaning of clothes, utensils, residence etc. and for preparation of different types of foods and drinks.

Water is a nature's gift to the creation. It falls on the earth as rain, becomes stored in the natural reservoirs like, river, lake, sea etc. artificial reservoirs like pond, well, trench etc. as overground water and some portion becomes stored under the ground as underground water. The overground water can be used directly from the sources but to use the underground water tubewell, deepwell etc. are to be installed.

Water, being the unavoidable need for the human society, is occupying an important place in study and research. Many studies have been conducting in different levels to understand details about water scientifically. Study on the water cycle, types, qualities, identification of pure / polluted water, purification of impure / polluted water, healthy preservation etc. are being taken as the areas of study.

When the question of the knowledge of water of the ancient human society is raised then, as an Ayurvedic person, the descriptions available in the ancient Ayurvedic classics come to the mind. Here a discussion on the available concepts in Susruta Samhita, the first book on Surgery, is made for the appraisal of the scientific society.

Keywords: Water; Nature's gift; Overground; underground water; Susruta Samhita

1. Introduction

It is agreed and proved that, no living being can live without water. Every living agent needs water for different purposes every moment. Soil needs water to maintain its fertility, plants need for growth and multiplication, animal and bird needs for cleaning of the body, reduce the effect of heat and drink. The need of water for the human is far more than the others. A man needs water in every step from morning to night. A man cleans the excretory orifices, mouth, eyes, the whole body (bath), clothes, utensils, food materials, residential places, cooks food, grows crops by using water. At least two litre water is used by every individual daily for drinking purpose to maintain health.

Since creation water is gifted by the nature by maintaining a cycle beginning with evaporation to rain. Through evaporation the nature takes water from the earth and returns it in the form of rain. The rain water remains stored in the natural reservoirs like river, lake, sea etc., artificial reservoirs like pond, well etc. and also as underground water from where it is used as per necessity.

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Water is being considered as a sacred gift of the nature that helps a lot but sometimes proves to be the aetiology of some unwanted situations. Hence the human beings have been continuing tireless study and research on water to know its composition, formation, source, need, factors that effects on its purity, harm can be caused due to improper use etc. and till date a good number of informations are gathered.

As the proof of curiosity and enthusiasm of the human mind, in ancient India also vivid study and research were conducted by a group of scientists. The study made by the Ayurvedic scholars have an accountable contribution in this field. A study and discussion on the concepts of Susruta, the father of Indian Surgery, as mentioned in Susruta Samhita, seems to have time tested importance to reflect the depth of study and observation on water.

Aims and objectives

This is a literary review conducted with the following aims and objectives –

- To study the Susruta Samhita in detail with the aim to collect the informations in relation to water
- To note all the findings in order to make it ready for study and analysis
- To discuss the concepts in modern light to make them understandable
- To frame opinion in the form of summary and conclusion on the scientific and enthusiastic studies of Susruta on water and, in the form of a scientific article, to send for publication in an wide circulated peer reviewed journal

2. Materials and methods

The study was conducted with the materials following the method mentioned below

- Susruta Samhita was studied in detail in the Central Library of Sri Sri College of Ayurvedic Science and Research Hospital, Sri Sri University, Cuttack, Odisha, India
- The findings related with the aims and objectives of the study were noted and organized
- A discussion was made on the findings with an aim to evaluate the concepts
- A summary and a conclusion was prepared and the references were cited
- The article was sent for publication in peer reviewed journal with the aim to make it appraisable for the scientific community.

3. Result

The study revealed the observations cited below –

- Susruta has discussed about water (jala) in the chapter named as “**DRAVADRAVYAVIDHIMADHYAYAM**” (chapter for liquid substances) [1]
- Antariksha jala (rain water) is described as anirdeshyarasa (tasteless), amrita (like nacter -of best quality), Jivana (good for livings), tarpana (nutritious), dharana (holds the life), ashwasajanana (produces happiness), srana-klama-pipasa-mada-murcha-tandra-nidra-dahaprasamana (relieves tiredness, lathergy, thirst, delirium, fainting, drowsiness, sleep and burning sensation), pathya (useful) [2]
- This antariksha jala, after falling on the ground, becomes induced with the different types of tastes like sweet (madhura), sour(Amla), salt (lavana) etc. and remains stored in river (nada-nadi), lake (sarobara), pond (tadaga), well(bapi), well without parapet wall(kupa), the places where water is stored by digging in soil (udvida), the place where water is stored or available after removing the sands (bikira),the water in the fields (kedara),the water reservoirs covered with leaves(pallaba) etc. [3]
- Susruta quotes the concept of some scholars saying the taste of water according to the taste of the soil like – red soil (lohitapradesha) –sweet (Madhura), blackish soil (kapilapradesha) – sour (amla), pale soil (pandupradesha) -salty (lavana) , blue soil (nilapradesha) – pungent (katu), yellow soil (pitapradesha) – bitter (tikta), white soil (suklapradesha) – astringent (kashaya) [4]
 - In the next sloka the author has said that, he does not agree with the concept as the taste of water is dependent upon the dominance of the mahabhuta (the 5 natural components responsible for creation), like – prithvi mahabhutadhikya – amla and lavana rasa, jala mahabhutadhikya – madhura rasa, teja mahabhutadhikya – kashaya rasa, akasha mahabhutadhikya – avyakta rasa[5]
- (5)Rain water (antariksha jala) is considered to be of 4 types as – dhara (falls with great speed), kara, taushara and haima. Among these dhara is best due to its lightness (laghuta). Again it is of two types- gangya and

Samudra. The rain water of autumn season (Aswina masha) is considered as gangyajala. For differentiation of these two types of water it is advised to keep cooked rice bolus in rain in silver pot (rajata bhanda) for 1 hour. If the rice bolus will not show any change then it proves that, the rain water is gangya. If seen otherwise then it is samudrajala. Gangyajala is advised to collect by using a clean, white cloth or by keeping a clean pot on the roof of the house. If such water cannot be collected then the water available on the ground should be used which is having dominance of akasha mahabhuta (akashagoonabahula). This surface water (bhoumajala) is said to be of 7 types – (1)Kaupa (well water), (2)nadeya(river water), (3)Sarasa (lake water), (4)tadaga (pond water), (5)prasravana(spring water), (6)audvida (ground water), (7)chauntya(water of well without parapet wall) [6]

- The advice of use of water with special respect to season and source is as follows[7] –
 - Rainy season (barsha ritu)- antariksha or audvida (mahagunatwat) due to their superior quality
 - Autumn season (sarad ritu) – Sarba (prasannatwat) all available water for their purity
 - Pre winter (hemanta ritu) – lake (Sarasa) or pond (tadaga)
 - Spring (basanta ritu) – well (kaupa) or spring (prasrabana)
 - Summer (grishmaritu) – well (kaupa) or spring (prasrabana)
 - Winter (pravrit) – water preserved in hole made in soil (chauntyajala) if not dirty due to rain
- A person is said to have different types of external and /or internal diseases on external and /or internal use of kita-mutra-purisha-anda-shavakothapradushita or trina-parna-utkarayukta, kalushajala of barsharitu (water of rainy season contaminated with the putrefied excreta, body etc. or different types of grass, creepers, weeds etc.) [8]
- A nice description on the procedure of examination of water is interesting. For the purpose the following points are mentioned [9]–
 - Characters of DUSHITA JALA – the water that is kept covered by clay (panka), algae (saibala), grass (trina), lotus leaf (padmapatra) etc. and cannot be touched by Sunrays (rabikirana), Moonlight (sishirakirana) and air (anila) etc. and that has gandha, barna and rasa.
 - Water may get 6 dosha as – touch(sparsha),colour (rupa), taste (rasa), smell (gandha), action (biryya) and assimilation (vipaka) as mentioned below –
 - ✓ Sparshadosha – sliminess (paicchilya),hotness (aushnya), irritant to teeth (dantagrahita)
 - ✓ Rupadosha – mixed with clay (panka), mixed with sand (sikata), mixed with algae (saivala),multicolour (bahubarnata)
 - ✓ Rasadosha – having special taste (vyaktarasata)
 - ✓ Gandhadosha – having bad smell (anistagandhata)
 - ✓ Biryyadosha – If, after use, the user feels thirst (Trishna), heaviness (gaurava), pain (shoola), salivation (kafapraseka) etc.
 - ✓ Bipakadosha – if the water after drinking digested lately (chirat bipachyate) and produces bistambha (abnormal sound in the abdomen).

Further it is said that, such situations are not seen in case of Antariksha jala.

- For purification of water the following methods are mentioned [10] –
 - If the water is contaminated extremely (atidushtajala) – boiling (agnikwathana)
 - If the water is mildly contaminated (alpadushtajala) – exposing to Sunrays (suryyatapapratapana)
 - Putting hot piece of iron, soil etc. into water also purifies water (pindasikataloshtranang nirvapanam)
 - filtering with clean cloth (prasadana)
 - By submerging the flowers of nagakeshara (Mesua ferrea), champaka (Magnolia champaka), Utpala(Nymphaea caerulea), patala (Stereospermum suaveolens) etc. into the water (adhibasana)
- The best utensil for storage of water are said to be made of gold (subarna), silver (rajata), copper (tamra),bell matel (kangshya), gems (moni), earth (bhauma) [11]
- Dushita (vyapanna) and rain water except rainy season should always be rejected as it is harmful (doshajanana - ahitakara). The person who uses this dushita jala without proper purification may suffer from the diseases like - oedema (swayathu), anaemia (pandu),skin diseases (twakroga), indigestion (avipaka), breathing difficulty (swasa), cough (kasha), sneez (pratishyaya), pain (shoola),tumors (gulma), abdominal diseases (udarakroga) etc.[12]
- A list of substance that clean water (prasadana dravya) is also mentioned. They are – Kataka (Nirmali)(Strychnos potatorum), Gomedaka(zircon – a precious stone), Bisagranthi (Kamalamoola)(root of Mallotus philippinensis), saibalamoola (kai in Hindi), Bastra (cloth), Mukta(pearl), Moni (Sphatika)(alum) [13]
- 5 number of things are mentioned to keep the jalapatra (water pot) safe as –
 - falaka,
 - Tryashtaka,

- Munchabalaya,
- Udakamanchika and
- Shikya [14].
- All these are seemed to be the arrangements of different shape and size made of wood or other materials.
- 7 procedures of jalashitikarana (making the water cold) as mentioned are –
 - To expose the water to air (pravatasthapanam),
 - Covering of the water pot with wet cloth (udakaprakshepanam),
 - Stiring with clean stick (yastikabhramanam),
 - Exposing to the moving fan (vyajana),
 - Keeping the water pot on wet cloth (bastroddharana),
 - Keeping of the water pot on wet sand (balukaprakshepana) and
 - Keeping of the water pot on hanger (shikyavalambana) [15]
- The best water (Gunabat jala) is defined as – odourless (nirgandha), tasteless (avyaktarasa), that pacifies thirst (trishnaghna), holi (clean) (shuchi), cold (shitala), clear (accha -swaccha), light (laghu) and produces happiness (hridya) [16]
- The qualities of the river water [17]–
 - Rivers flowing towards West (Paschimabhimukhah) – pathya as it is laghu (light, hence useful)
 - Rivers flowing towards East (Purbabhimukhah) – na prasashyate as it is guru (heavy, hence not useful)
 - Rivers flowing towards South (Dakshinabhimukha) – natidoshala as it is sadharana (it contains the common qualities, hence not bad)
 - Rivers originating from Sahyadri (Sahyaprabhava) – kusthajanana (causes skin diseases)
 - Rivers originating from Bindhya (Bindhyaprabhava)- kustha-pandujanana (causes skin diseases and anaemia)
 - Rivers originating from Malaya mountain (Malayaprabhava) – krimijanana (causes different types of worm)
 - Rivers originating from Mahendra mountain (Mahendraprabhava) – sleepada – udarajanana (causes filariasis and abdominal diseases)
 - Rivers originating from Himalaya (Himabatprabhava) – hridroga – swayathu-shiroroga-sleepada-galagandajanana (causes heart disease, oedema, headache, filariasis, goitre)
 - Flowing towards east and west originating from Avanti pradesha (Prachyavanta – aparabantya) – arshjanana (causes piles)
 - Pariyatraprabhava – pathya (useful), balarogyakara (produces strength and disease free state)
- Character of water according to the speed of river - (i) light (laghu) and clean (amala) if the river flows with speed (shighrabaha), (ii) heavy (guru) and dirty (kalusha) when the water remains covered with algae (saivalasangsanna) and flows slowly (mandaga) [18]
- The water of the river that flows through the deserts (marupradesha – where sand and stone are more) is bitter and salty (tikta-lavanarasa), light (laghu), sweet after digestion (madhura bipaka). It produces strength (balakaraka) and useful (hitakaraka) [19]
- All the surface water (bhaumajala) is advised to collect during morning time as it is cold (shita) and clean (amala) which are the best qualities of water [20]
- The water that remains exposed to Sunrays (arkakirana) during daytime and Moonlight (indurashmi) during night time is aruksha and anabhishtandi (pure and useful like rain water- gaganambu) [21]
- The rain water (gaganambu) collected and preserved in clean vessel pacifies the 3 body humors (tridoshaghna), produces strength (balya), rejuvenator (rasayana) and useful for memory (Medhya) [22]
- Chandrakantodbhava jala (Chandrakanta is a valuable gem) (the water may be treated by submerging it) is said to be germicide (rakshoghna), cold (sitala), produces happiness (hladi), cures fever, burning sensation and effects of poison (jwara-daha-bishapaha), pacifies pitta (pittaghna) and clean (bimala) [23]
- Indications of cold water (shitala jala) – fainting (murcha), diseases due to vitiation of pitta (pittajaroga), affected with heat (ushna), burning sensation (daha), poison (bisha), diseases due to vitiation of blood (raktadosha), affected with alcohol (madatyaya), delirium (bhrama), fatigue (klama), asthmatic attacks (tamakaswasa), emesis (bamana), bleeding through upper parts of the body (urdhaga raktapitta) [24]
- Contra-indications of cold water (shitala jala) – pain in the flanks (parshwashoola), sneez (pratishyaya), neurological disorders (vataroga), feeling of obstruction in the throat (galagraha), flatulence (adhmana), inappropriate function of G.I system (stimitakostha), who has undergone purificatory therapy recently (sadyahshuddha), acute fever (nabajwara), hiccough (hikka), who has taken therapeutic oil (snehapita) [25]
- Qualities of water according to source [26] –
 - River water (nadeya) -increases batadosha (batala), produces dryness (ruksha), increases digestive capacity (deepana), light (laghu), expels out the accumulated dosha (lekhana)

- Lake water (Sarasa) – pacifies thirst (trishnaghna), increases strength (balya), astringent in taste (Kashaya), sweet (Madhura), light (laghu)
- Pond water (tadaga) – increases bata (batala), sweet (swadu), astringent (Kashaya), pungent after digestion (katupaki)
- Well water (bapya) – pacifies bata and kafa (batashleshmahara), slightly alkaline (sakshara), pungent (katu), vitiates pitta (pittala)
- Water of hole in ground (Kaupa) – slightly alkaline (sakshara), vitiates pitta (pittala), pacifies kafa (shleshmaghna), increases digestive capacity (Deepana), light (laghu)
- Well without parapet wall (chauntya jala) – increases digestive capacity (agnikara), dry (ruksha), sweet (Madhura), does not increase kafa (na kafakrit)
- Spring water (prasrabana) – pacifies kafa (kafaghna), increases digestive capacity (Deepana), beneficial for heart (hridya), light (laghu)
- Collected by making hole in soil (audvida) – sweet (madhura), pacifies pitta (pittashamana), does not produce burning sensation (abidahi)
- Water found by removing the sands (baikira) – pungent (katu), slightly alkaline (sakshara), pacifies kafa (shleshmaghna), light (laghu), increases digestive capacity (Deepana)
- Water collected in field (kaidara) – sweet (madhura), heavy after digestion (gurubipaka), produces vitiation of dosha (doshala)
- Water collected in small holes (palwala) - like kaidarajala (No. x)
- Sea water (Samudra) – of bad smell (bishra), salty (lavana), vitiates all dosha (sarbadoshakrit)
- Qualities of water according to desha [27] –
 - Wet and rainy places (anupa desha) – has a number of unexpected qualities (anekadosha), increases the tendency of obstruction (abhisyanidi). Hence rejected (garhita)
 - Dry places (jangala desha) – free from the dosha of anupadesha. hence prasasta (good for use)
 - Place that are neither wet nor dry (sadhara desha) – does not produce burning sensation (abidahi), reduces thirst (trishnaghna), good for use (prasasta), increases happiness (prtibardhana), increases digestive capacity (deepana), sweet (swadu), cold (shita), light (laghu)
- Boiled water (ushnodaka) – reduces kafa, meda, bayu and ama (kafa-meda-anila-amaghna), increases digestive capacity (Deepana), purifies urinary bladder (bastishodhana), cures breathing difficulty, cough, fever (swasa-kasa-jwarahara), useful (pathya) [28]
- Boiled water keeping ¼ th of the initial quantity (chaturbhaga avashesha kwathya jala) – has no movement (nirvega), donot produce froth (nisphena), clear (Nirmala), light (laghu). Hence said to be of the best quality [29]
- Water kept overnight (paryushita jala) – It should not be given to nobody (rogi or swastha). This water is sour in taste (amla) and vitiates kafa (kafotkledi) [30]
- In the diseases due to use of alcohol (madyapana), pitta and sannipata boiled water after cooling (shritashita jala) should be used [31]
- Coconut water (narikelodaka) is oily (snigdha), sweet (swadu), cold (hima), beneficial for heart (hridya), increases digestive capacity (deepana), cleans the urinary bladder (bastishodhana), nutritious (brishya), pacifies pitta (pittaghna), reduces thirst (pipasaghna), heavy (guru) [32]
- Special indications of shritashitajala – burning sensation (daha), loose motion (atisara), diseases due to pitta (pittaroga), diseases due to blood (raktaroga), fainting (murcha), diseases due to alcohol (madyaroga), poisoning (bisharta), thirst (trishnarogi), vomiting (chardirogi), delirium (bhramarogi) [33]
- The conditions when water should be used in small quantity frequently – loss / reduced appetite (arochaka), sneez (pratishyaya), salivation (praseka), oedema (swayathu), ematiation (kshaya), reduced digestive capacity (mandagni), abdominal diseases (udararoga), skin diseases (kustha), fever (jwara), eye diseases (netramaya), ulcer (brana) and diabetes mellitus (madhumeha) [34]

4. Discussion

The observation and result of the present study reflect the following points for discussion –

Susruta, though was a person from the surgery discipline then also he paid importance on water and other natural elements that are the daily need of the living organisms, specially for the human beings. He observed and realised the need of water for the human for maintenance of health. His observations also reflect that, use of impure / polluted water may be proved to be harmful to the human society. Hence one should know the process of identification of pure / polluted water, procedures of purification and the methods of appropriate use.

The observation of Susruta about the different sources of water and the description of their qualities indicates the minuteness of observation and knowledge of the scholar. The descriptions of rain water, river water, well water, pond water, water of Anupa desha, Jangala desha, Sadharana desha etc. are interesting. The opinion on the qualities of water depending upon the place where it is stored needs some more study. Water is said to have no specific quality of its own. The qualities like taste, odour etc. are taken by the rain water according to the soil where it falls /stored.

The effect of the light of the Sun, Moon and air are described nicely by the author. As it is agreed unanimously that Sunrays have the capacity to destroy a good number of disease causing organisms like virus, bacteria, fungus, worm etc. hence the concept of purification of water by Sunrays cannot be refused. The effect of the Moon on water is probably a unique concept of the Ayurvedic scholars. The air has a good effect on water as it controls the speed of movement of water and also sometimes throws the dirty substances in water reservoir which in due course or immediately can cause pollution of the water.

The source and the character of the soil through which a river flows is another interesting fact mentioned as the determinant of the character of water. Sending water through certain arrangements with great speed (aeration), beds prepared by using sands and stone of different size in layer (filtration) are scientific methods of water purification. Hence the dependance of the quality of water on its source like Himalaya, Bindhya etc. and the character of soil through which it flows like sandy, stony, clayee etc. and the speed of water cannot be denied.

Description of the different river water as the causes of some specific diseases needs analysis of the quality (contents) of the respective water and a survey of the diseases suffered by the population residing on the banks of the rivers mentioned.

Boiling is agreed to be the best and easiest method of water purification. Susruta, before about 3000 years of Christ has also nicely described the qualities and benefits of boiled water and said it as the best for all persons in all seasons.

The coconut water is described by the author nicely along with its special indications. The description indicates that there is more scope of study on it.

The methods of examination of water and the characters of impure / harmful water mentioned are also scientific. An individual, only by observing the character of water, externally with naked eye, touch, taste, smell etc. are practically useful as in the day to day life one cannot carry the scientific instruments to analyse (the) water.

Susruta has given a list of vegetable and mineral substances to use for water purification. Study on their effects and usefulness for the purpose can be considered important. But classical description of the qualities and effect of the said substances are strongly supportive of their use for the purpose.

5. Summary

From the study the following points can be taken as summary –

- Susruta, though was a person of Surgery, paid importance on study on the most important natural element “water”.
- He studied water with special reference to source, reservoirs, quality, identification of purity/pollution, region and source wise character and effect on the user, methods of purification etc. in detail.
- Most of the concept of Susruta has scientific explanation.
- Some concepts available in the Samhita can be taken for research to re evaluate the scientific knowledge of the scholar. Study and research on the concepts of Susruta can be considered as valuable and beneficial for the human society even in the present time.

6. Conclusion

As conclusion of the study it can be said that, exploration of the concepts of Susruta in relation to water needs more study adopting the globally accepted methods which can be expected to be miraculously beneficial for the human society.

Let all join hands to explore the concepts of our ancestors and make our life beautiful.

Compliance with ethical standards

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