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Original Research

Changes in Color of Urine in the Patients on Concoctive (*Munzij*) Therapy : An Observational Study

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Abstract

There are various causes of diseases but retention of morbid matter (*mawad-e-fasida*) in the body is one of the main causes and these morbid matters must be evacuated from the body to regain health. Concoction (*nuḍj*) and evacuation (*tanqiya*) are the two prime methods that ancient physicians described and recommended for the treatment of such diseases. Concoction is a process of moderation and modification in the viscosity of morbid matter to make them suitable for evacuation conveniently from their sites of lodgement. Several indices of concoction can be seen in the pulse, urine, and stool, which help to find out level and stages of concoction. Drugs, which appropriately alter the consistency of morbid matter to render them easily eliminable from the body, are known as concoctive (*Munzijat*). A total of 125 eligible participants, after getting their written informed consent, were enrolled in the study and 50 participants completed the study. They were advised to take a decoction of phlegmatic concoctive drugs once in the morning before breakfast for 15 days. Three urine samples of each patient were collected: before starting the concoctive therapy, at 5th day and 12th day. The changes in the color intensity of urine were observed by photoelectric colorimeter at a wavelength of 580 nm (yellow filter). The patients were advised to refrain from such diets and drugs which tend to change the color of urine during the entire study period. Statistical analysis was restricted to those patients who completed the study. The Mean ± SD of optical density at 0 day was 0.0872 ± 0.0284; while it was 0.0782 ± 0.0275 at 5th day which was not statistically significant ($p > 0.05$). The Mean ± SD of optical density on 12th day was 0.0484 ± 0.0196 which was found statistically significant ($p < 0.01$) in comparison to baseline values. Concoction is a continuous process of medicatrix naturae (*tabiyat*) which is facilitated by humour specified concoctive drugs. The statistically significant change in urine color indicates the effect of concoctive drugs on body humours.

Keywords: Concoction; Unani medicine; Morbid matter; Urine color; Humours

Introduction

Disease is an unnatural state of the human body that leads disturbed functions [1-6]. Broadly, it is categorised into two types: temperamental derangement of simple or compound organs and derangement of structure in compound organs [3,5-7]. In both types, functions of the organs are disturbed [5]. Temperamental derangement affects the organs in two ways; in simple form or without involvement of any matter, and with the involvement of matter [4,7-9,]. *Abu Sahal Masihi* stated that the human body is composed of three types of matters: solid (organ), liquid (humours) and gase-

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ous (pneuma) [10]. The diseases are the result of qualitative, quantitative or both derangements of humours in the body which are supposed to be occurred due to the ingestion of abnormal diet, and the diseases of vegetative/digestive faculties and related organs [8]. These pathological humours should be eliminated from the body to achieve the healthy state [11]. Medicatrix naturae eliminates these morbid matters form the body. Sometime, medicatrix naturae is found unable to eliminate these morbid matters from the body itself due to a huge deviation of these humours from the optimum state. In this condition, certain drugs are required to facilitate the elimination of these matters from the body. These drugs are known as concoctive drugs [5,12]. According to *Ibn Sīnā*, "Concoctive drugs make the morbid matter eliminable due to their moderate calorific and astringent properties" [13,14].

Concoction is a unique and broad concept in Unani medicine. *Zakariya Razi* described that concoction stands for the predominance of medicatrix naturae over morbid matter [2]. Qamri defines concoction as "strengthening of the medicatrix naturae over the morbid matter and preparing the matter to be easily evacuated from the body" [15]. *Akbar Arzani* explained that concoction is a process in which moistness of the morbid matter is acted upon by innate heat (*Ḥararat-i-Gharīziya*) in order to make it suitable for the elimination [6]. The innate heat considered as a tool of medicatrix naturae for the process of concoction [6,16]. The changes in the abnormal humours specifically in their color and consistency by the action of medicatrix naturae and concoctive drugs are known as Concoction (*Nuḍj*) [11,16,17].

Pulse, urine, sputum, and stools examination are used as the diagnostic, as well as prognostic indicators of a disease [18,19]. Physicians in Unani medicine pay attention to the techniques of urine collection and the diagnostic characteristics of urine such as color, consistency, volume, odor and froth [20]. During the process of concoction, qualitative modifications of morbid matter occur which can be observed during urine examination. There are many attributes to find the sign of concoction during urine examination including color. Changes in urine color are mostly due to the different urine concentrations, ingested substances, and metabolic end products [21]. As per the Unani concept, diseases are caused by morbid matter. The elimination of this morbid matter is important. Medicatrix naturae and concoctive drugs produce few qualitative changes in the morbid matter and prepare it to be eliminated from the body. After the concoction, the elimination process starts through normal channels like stool, urine, sweat etc. The elimination of morbid matter in urine changes it color. Viscosity and optical/refractive index can be used as physical properties of urine in medical discipline as the complimentary investigatory tool in addition to existing pathological and biochemical approaches. Urine is one of the important means of elimination of waste materials from the body and the first morning urine is more likely to reveal the presence of formed substances and changes [22]. The change in urine color is therefore considered an important indication of concoction. After starting the concoctive drugs, medicatrix naturae starts maturing the morbid matter which appears primarily in the urine color followed by consistency [7]. The objective of the present study was to quantify the changes in the color of urine among the patients on phlegmatic concoctive drugs.

Materials and Methods

Present study was conducted in the Biochemistry lab of NIUM Hospital from February - 2019 to December - 2019. The protocol was approved by Institutional Ethical Committee [Ethical Clearance Number - NIUM/IEC/2017-18/030/Kul/01]. Before starting the study, a protocol was developed in accordance with the Ethical Standard of Good Laboratory Practice. The trial was registered on clinical trial registry of India (www.ctri.nic.in) bearing a number CTRI/2019/04/018518.

Clinically diagnosed patients of different kinds of phlegmatic diseases, who had been prescribed specific concoctive therapy, were enrolled in the study. The patients were recruited from the IPD of National Institute of Unani Medicine hospital. Clinically diagnosed patients (by the expert of the field) of phlegmatic disease, aged between 15-70 years of either gender were included in the study. Pregnant, lactating women, patients suffering from chronic cardiac, hepatic or kidney diseases and the patients taking such foods or medicines which can change their urine color were excluded from the study.

Patients fulfilling the inclusion criteria were given the information sheet having details regarding the nature and procedure of study. Patients were given enough time to go through the study details mentioned in the information sheet. They were given an opportunity to ask any question and if they agree to participate in the study. They were asked to sign the informed consent from. A total of 50 patients were included in the study (Figure 1)

Patient fulfilling the criteria were provided a sample container for collection of urine sample for colorimetric measurement of color intensity before starting the concoctive therapy. Color intensity difference was observed at 580 nm (yellow filter). Patients following the protocol of the study were again provided a sample container for second and third samples i.e. at 5th and 12th days, respectively, and their samples were collected for colorimetric assessment.

Ingredients of Phlegmatic concoctive (Munzij-e-Balgham)

Aslussoos (*Glycyrrhiza glabra* L.), Badiyan (*Foeniculum vulgare* Mill.), Biekh-badiyan (*Foeniculum vulgare* Mill.), Biekh-Izkhar (*Andropogon laniger* Desf.), Biekh-Karafs (*Apium graveolens* L.), Biekh-Kasni (*Cichorium intybus* L.) [23-25]. All the patients were advised to soak all the ingredients in equal quantity (6 g) in 250 mL of water at night. They were further advised to make a decoction in the morning and consume it before breakfast once in the morning for 15 days.

Photoelectric colorimeter which estimates color quantification was used. It is commonly used to determine the concentration of a known solute in a given solution by the application of the Beer-Lambert Law. It is easy and conventional method to determine the concentration of a solution by measuring its absorbance in a given wavelength of light [26-28]. The methods involving quantitative analysis of blood, urine and other biological secretions are based upon the production of a colored compound in a solution. In this, light passing through a colored solution is made to fall on photoelectric cells, which generates an electric current and give reading accordingly [28]. The extent of absorption of light by a colored solution mainly depends upon two factors:

1.Thickness of the homogenous solution

2.Intensity of the color [26]

There are two common methods of expressing the amount of light absorbed by a solution:

1.Percent transmittance

2.Optical density (OD) - It is the negative logarithm of the percent transmittance. As the concentration of the colored solution increases, OD increases and % transmittance decreases, e.g., if the transmittance is 100% the OD will be 0 [28].

Three urine samples of each patient were collected at 0 day (before starting the concoctive drugs), 5th day and 12th day. Every time patients were instructed not to take any urine color changing food or medicines and advice to drink adequate amount of water. Patients who fail to follow up the complete duration of study according to protocol were withdrawn from the study and not included in statistical analysis.

The statistical analysis was restricted to those patients who completed the study. The paired t-test was used to observe the difference in color intensity of collected samples.

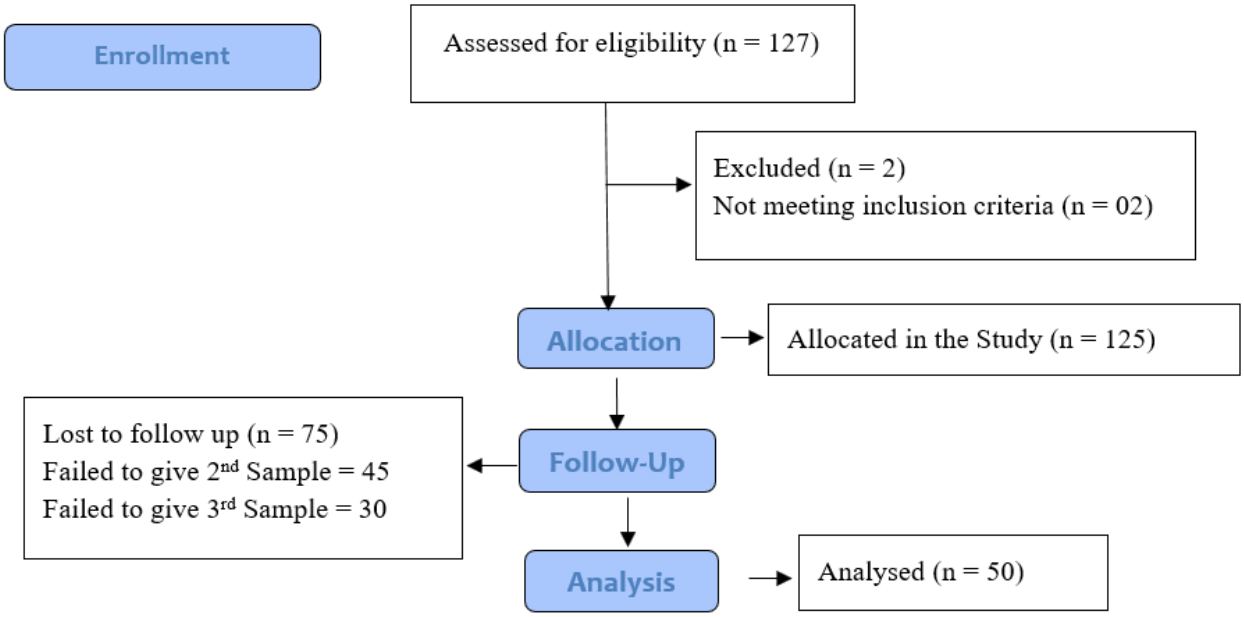

Figure 1. CONSORT flow diagram

Results

Table 1 shows the distribution of patients according to the duration of disease. 25 (50%) patients had the disease for less than one year. 14 (28%) patients were suffering from disease for 1 to 5 years; while 8 (16%) patients had the diseases for 5 to 10 years. Only 3 (6%) enrolled patients were suffering from the disease for more than 10 years.

Color intensities of urine samples were observed at 580 nm particularly using yellow filter at 0-day, 5th day and 12th day and readings were recorded and depicted in table 2.

Table 1. Distribution of patients according to duration of disease

Duration of Disease	No. of Patients	Percentage
Up to 1 year	25	50%
1-5 years	14	28%
5-10 years	8	16%
>10 years	3	6%
Total	50	100%

Table 2. Changes in color intensity of urine in the patients on concoctive drugs

S. No.	0 day	5th day	12th day	S. No.	0 day	5th day	12th day
1.	0.08	0.06	0.02	26.	0.05	0.05	0.02
2.	0.09	0.10	0.20	27.	0.11	0.08	0.02
3.	0.04	0.04	0.01	28.	0.03	0.02	0.02
4.	0.03	0.03	0.01	29.	0.04	0.12	0.05
5.	0.08	0.05	0.03	30.	0.03	0.04	0.01
6.	0.29	0.12	0.08	31.	0.12	0.11	0.03
7.	0.13	0.06	0.01	32.	0.1	0.16	0.02
8.	0.13	0.06	0.02	33.	0.04	0.02	0.01
9.	0.2	0.09	0.05	34.	0.24	0.03	0.03
10.	0.03	0.02	0.02	35.	0.08	0.04	0
11.	0.09	0.06	0.30	36.	0.02	0.02	0
12.	0.04	0.04	0.01	37.	0.07	0.05	0.01
13.	0.04	0.08	0.01	38.	0.07	0.18	0.03
14.	0.06	0.04	0.02	39.	0.02	0.04	0.25
15.	0.04	0.01	0.01	40.	0.03	0.02	0.01
16.	0.66	0.36	0.21	41.	0.05	0.06	0.02
17.	0.12	0.03	0.02	42.	0.14	0.09	0.24
18.	0.04	0.01	0.02	43.	0.04	0.02	0.01
19.	0.11	0.22	0.03	44.	0.08	0.06	0.02
20.	0.17	0.12	0.03	45.	0.09	0.07	0.02
21.	0.03	0.02	0.02	46.	0.02	0.02	0.04
22.	0.04	0.04	0.04	47.	0.05	0.06	0.02
23.	0.04	0.1	0.12	48.	0.07	0.05	0.05
24.	0.05	0.04	0.01	49.	0.03	0.03	0.07
25.	0.04	0.07	0.05	50.	0.07	0.6	0.07

As shown in table 3, optical density of urine increased in 10 (28%) patients at 12th day of concoctive therapy; while it was decreased in 38 (76%) patients. The optical density remained unchanged in 2 (4%) patients at 12th day.

Means ± SDs of color density as well as obtained p values using paired t-test between 0 day to 5th day and 0 day to 12th day were depicted in table 4. The mean ± SD of optical density at 0 day was 0.0872 ± 0.0284; while it was 0.0782 ± 0.0275 at 5th day of concoctive therapy. This change was not statistically significant ($p > 0.05$). The mean ± SD of optical density at 12th day was 0.0484 ± 0.0196 and found statistically significant ($p < 0.01$) in comparison to 0 day.

Table 3. Effect of concoctive drugs on optical density of urine

Optical Density	No. of Patients	Percentage
Increased	10	28%
Decreased	38	76%
No change	2	4%
Total	50	100%

Table 4. Analysis of the effect of concoctive therapy on optical density

	Baseline (n = 50)	5th day (n = 50)	12th day (n = 50)
Mean ±SD	0.0872 ± 0.0284	0.0782 ± 0.0275	0.0484 ± 0.0196
P value	-	$p > 0.05$	$p < 0.01$

Discussion

Present study was conducted to find out any changes in urine color after taking concoctive drugs as claimed by ancient Unani physicians. The mean of optical densities among the patients at 0 day was higher which indicates a darker urine. The color of urine started to lighten once the concoctive drugs were started. At 5th day, the mean of optical densities was reduced but was not statistically significant; while at 12th day, statistically significant changes were noticed in optical density of urine samples among the patients on concoctive drugs. This color change in optical densities indicates a light color urine after concoctive drugs.

This result was in accordance with the concept of Unani physicians regarding concoction of abnormal phlegm i.e. the color of urine lightens after concoction as abnormal phlegm excretes in urine [29,30].

The trend of present study was fully in support to the concept given by ancient scholars related with concoctive and purgative therapy as a supreme line of treatment in humoral diseases. The sign and symptoms of concoction in the pulse, urine and stool are diagnostic as well as prognostic tools in humoral diseases. Eminent Unani physicians mentioned that concoction is an action of medicatrix naturae which is performed over the morbid matter so that it can be eliminated from the body. The action of concoction by medicatrix naturae is started as disease entered in growing stage (*Zamāna-i-Tazayyud*) which indicates the second

phase of disease [30,8,11]. According to *Ibne Sina*, transparent urine is a sign of cold temperament or phlegmatic dominance [20].

Limitations

To the best of our knowledge, this was the first clinical study of its kind. There are certain limitations of the study such as small sample size, other parameters in the urine, and comparison with published evidence. More rigorous clinical studies on larger sample size is needed to establish the result of the present clinical study.

Conclusion

Temperamental diseases may develop either without involvement of any matter (*Amraz Sue Mizaj Sada*) or with the involvement of matter (*Amraz Sue Mizaj Maddi*). *Amraz Maddi* are more commonly found and caused by the qualitative or quantitative disequilibrium of body humours. To regain the healthy body state, these morbid humours (morbid matters) should be eliminated from the body. Medicatrix naturae removes the morbid matter from the body if it is in small quantity or deviated little from its normal quality. When morbid matter is vigorously deviated from its normal state, either qualitatively or quantitatively, external support to medicatrix naturae is needed for the complete evacuation of this matter. This external support may be used in the form of concoctive drugs which make the matter eliminable from the body. Medicatrix naturae acts on this matter and removes it through urine, stool or sweat. The color of urine is changed due to the mixing of this morbid matter. In present study, we also found the changes in urine color after concoctive drugs. It can be concluded that concoctive drugs not only mature the morbid matter, but also helps to regain the healthy state.

Conflict of Interests

All authors declare no conflict of interest.

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