

Original Research Article

Efficacy of *Riyazat* (Physical Exercise) with *Hammam-E-Bukhari* (Steam Bath) in the Management of *Simane Mufrit* (Obesity)

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ABSTRACT

Background and Objective: *Simane Mufrit* (Obesity) has become a threat to world population. It is a well established risk factor for type 2 Diabetes, cardiovascular diseases, osteoarthritis etc. Despite tremendous developments of pharmacotherapy, no effective treatment for obesity has been developed yet. Hence, there is growing demand for alternate treatment with good efficacy, safety and cost effectiveness. Unani system of medicine offers management of *Simane Mufrit* through *Ilaj Bil Ghiza* (Dietotherapy), *Ilaj Bit Tadbeer* (Regimenal Therapy), and *Ilaj Bid Dawa* (Pharmacotherapy) but the efficacy of these modes of treatment has not been evaluated so far on scientific parameters, therefore, this clinical trial was conducted to find out efficacy of Unani regimen in the management of obesity.

Methodology: An open single arm pre and post without control interventional clinical trial was conducted at National Institute of Unani Medicine, Bengaluru. Total 30 patients were randomly selected who were advised *Riyazat* (Physical Exercise) (15 min treadmill walk) and *Hammam-e-Bukhari* (Steam Bath) (15min) with a diet plan having 600 Kcal deficits for duration of 5 weeks (35 days). All the patients were assessed on efficacy and safety parameters. Data were statistically analyzed by Student's t-test (Paired).

Results: There was statistically significant improvement in objective parameters (Weight, BMI, Waist Circumference, Waist HR, Skin fold thickness).

Interpretation & Conclusion: The test regimen exhibited significant reduction in efficacy parameters without any adverse effect. It may be concluded that the test regimen is safe and effective for the management of *Simane Mufrit*.

Key words: *Simane Mufrit*; Obesity; Weight; *Ilaj Bit Tadbeer*; Unani Medicine.

INTRODUCTION

Simane Mufrit (obesity) is a state of excess adipose tissue mass. [1] It may be defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size or an increase in fat cell number or a combination of both. [2] It is associated with an increased risk of type 2 diabetes,

cardiovascular diseases, and some forms of cancer and is a serious medical disorder. [3] Obesity is frequently considered to be a 'modern' disease, a reflection of the excesses of urbanized society. It is a well known disease since ancient Greco Arab period and was first described by *Buqrat*, later on other renowned Unani physicians

like *Jalinoos*, *Ibn-e-Sina*, *Zakariya Razi*, *Daud Antaki* and others, described *Simane Mufrit* in details in their books. *Zakariya Razi* writes about the treatment method of the disease in his treatise *Al-Hawi Fit Tibb* in detail. *Ibn-e-Sina* especially pointed out that obese people are more prone to develop cardiac and cerebral complications like stroke, syncope, coma, palpitation, bronchial asthma, haemorrhage and sudden death. According to Unani philosophy, *Simane Mufrit* develops due to increased *Rutubat* and *Burudat* leading to imbalance of *Akhlat* (humours) in the body and predisposing accumulation of morbid matter i.e. *Maddae Balghamiya* (*Shahmi Maada*).

Simane Mufrit (obesity) is perhaps the most prevalent form of malnutrition throughout the world. [2] It has become global epidemic and contributed to increasing burden of type 2 diabetes mellitus, cardiovascular disease, hypertension, stroke and eventually premature death worldwide. In present scenario the most popular method to define obesity is in terms of 'Quetelet Index' (QI) or Body Mass Index (BMI = weight in kilograms divided by height in meter square). A Quetelet Index (QI) or BMI of 25–30 kg/m² is considered as "overweight", >30 kg/m² is defined as "obesity", and >40 kg/m² is defined as "morbid obesity". [1] But for Asian Indians according to Western Pacific Region Office of WHO and IOTF, BMI <25 is considered as obesity. [4] Obesity has received considerable attention as a major health hazard. Till now there is no effective management for obesity in conventional system of medicine except bariatric surgery, which is not only an invasive procedure, but also so costly that everyone can afford it and has a lot of side effects. People are bored from taking a lot of medicines because of many reasons as, medicines are expensive, taking it regularly is a difficult task, fear of life threatening side effects etc. As a result, there is a growing need to search and develop an alternative anti obesity treatment that is effective, safe, well-tolerated and has no or

minimal pharmacological intervention, to alleviate such complex diseases of serious complications.

In Unani system of medicine, a number of drugs are being used in the management of *Simane Mufrit* but there is a lacuna regarding the treatment of the disease by the alteration in *Asbab-e-Sitta Zarooriya* i.e. treating the disease by *Tadabeer* (regimens). The Management of *Simane Mufrit* consists of *Ilaj Bit Tadbeer*, *Ilaj Bil Ghiza* and *Ilaj Bid Dawa*. Fundamentally, Diet therapy is very important, which can be achieved by *Taqleel-e-Ghiza* (Diet control). Furthermore, *Ksarat-e-Istifragh* by *Riyazat* and *Hammam-e-Bukhari* has been advocated in order to burn extra calories deposited in body and to eliminate *Maada-e-Balghamiya* for the correction of *Sue Mizaj Barid*.

In view of the above facts, a regimen consisting of *Riyazat* (Physical Exercise) and *Hammam-e-Bukhari* (Steam Bath) with *Taqleel-e-Ghiza* (Diet Control) was selected for the study. This regimen is recommended by *Zakariya Razi* in his book *Al-Hawi Fit Tibb* for the treatment of obesity. [5] As per Unani philosophy, obesity develops due to derangement of temperament particularly due to *Ghalbae Balgham*. As a matter of fact, any drug or regimen which can correct the derangement of temperament and help to evacuate *Maddae Balghamiya* will be definitely effective in the management of obesity. Therefore, an open single arm pre and post without control interventional clinical trial was designed to find out efficacy of this Unani regimen in the management of obesity, on scientific parameters.

MATERIAL AND METHODS

An open, single arm, pre and post without control interventional clinical trial conducted at National Institute of Unani Medicine (NIUM) Hospital Bengaluru, from October 2015 to February 2017. A comprehensive protocol was framed and put forward to Ethical Committee of National Institute of Unani Medicine, Bengaluru

which approved it with vide No. (NIUM/IEC/2014-15/023/IBT/03 Dated 16.04.2015). Later on trial was also registered in Clinical Trial Registry of India (CTRI) with vide No. (CTRI/2018/04/013428). After the approval subjects were screened for the eligibility criteria from both IPD/OPD of the hospital. During the selection procedure, complete history including general physical and systemic examination was carried out and recorded on a prescribed proforma which was designed according to the objectives of the study. Written consent was taken from all the subjects who were enrolled for the study. Diagnosed cases of *Simane Mufrit* (Obesity) of either gender with age group of 20-50 years and BMI between 30-35 Kg/m² were enrolled in study. Subjects with severe cardiovascular diseases, liver impairment, renal disorders, uncontrolled diabetes mellitus, secondary obesity (Hypothyroidism), pregnant or lactating women and other co morbidities were excluded. The study was designed as open single arm pre and post without control interventional clinical trial. The sample size was fixed to 30 patients. In this study the sample size was fixed to 30 subjects where as treatment period was fixed as twice weekly for 35 Days (10 sittings).

Objective Parameters: Weight, BMI, Waist circumference Waist hip ratio and Skin fold thickness (mid triceps, biceps, subscapular and suprailiac regions).

Investigations: Investigations such as Lipid profile (Total Cholesterol, Triglycerides, LDL, and HDL), SGOT (AST) and SGPT (ALT) were done in each and every case before starting and after completing the trial as safety parameter. Certain investigations such as random blood sugar (RBS), thyroid profile (T3, T4, TSH) and ECG were done before starting the trial with the aim to exclude the patients with pathological conditions mentioned under exclusion criteria.

Selection of Regimen: *Simane Mufrit* (Obesity) is a pathological condition, develops due to *Sue Mizaj Balghami* as well

as excessive intake of food. Therefore, for the rational and effective therapy for *Simane Mufrit*, a potent *Unani* regimen was required, which can revert the pathological condition of the disease to normalcy and restore health. *Tahleel-e-Balgham* with *Taqleel-e-Ghiza* is the principal of treatment of *Simane Mufrit*. *Tahleel-e-Balgham* is achieved by various regimenal procedures like *Riyazat* and *Hammam-e-Bukhari* etc. The *Mizaj* of *Simane Mufrit* is considered *Barid* i.e. *Sue Mizaj Barid* due to involvement of *Balgham* in the etiopathogenesis of this disease. After going thoroughly through *Unani* literature, a regimen consisting of two procedures *Riyazat* and *Hammam-e-Bukhari* with *Taqleel-e-Ghiza*, found having all requisite qualities. This particular *Tadbeer* (Regimen), selected for the trial, has been taken from *Kitab Al-Hawi fit Tibb*.^[5]

Mode of Application of Test Regimen:

After enrolling the subjects into study, baseline assessment was done for which body weight was assessed to the nearest 0.1 kg without shoes and in light clothing. BMI were assessed as kg/m². Waist and hip circumferences measured to the nearest 0.5 cm by using a non-stretchable measuring tape. Waist circumference measured midway between the lower rib margin and the iliac crest, hip circumference measured at the widest point of the trochanter and buttocks area. The waist hip ratio was calculated. Skin fold thickness measured by using digital skin calipers at four sites: mid triceps, biceps, sub scapular and suprailiac regions and the summation of all these measurements taken as final reading for skin fold thickness. Patients were asked to run on treadmill for 15 minutes at the speed of 6Km/hr without elevation. After treadmill walk (*Riyazat*) patients were shifted to *Hammam* for *Hammam-e-Bukhari* where they received steam bath for 15 minutes.

For the purpose of *Taqleel-e-Ghiza* (Diet control), the daily energy needs for each participant were estimated using the Harris-Benedict Revised equation. Total 600 Kcal deficit individualized diet plan

were provided to each subject for duration of 5 weeks (35 days). [4,6] No concomitant therapies were given to the subjects. For energy deficit, calculation of daily energy need is required; this was done by using Harris-Benedict Revised Equation, which was subsequently multiplied by an activity factor. [7]

Assessment: The assessment of efficacy was based on objective parameters. These include anthropometric measurements and laboratory investigations. Objective parameters for efficacy were assessed before starting the regimen and after completion. The assessment of safety such as lipid profile, SGOT (AST) and SGPT (ALT) were also done before and after the completion.

Statistical Analysis:

Student's t-test (Paired) was used for statistical analysis to evaluate pre and post procedure results. The Statistical software namely SAS 9.2, SPSS Version 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment Version .2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc. [8,9,10]

RESULTS

A total of 124 subjects were screened, out of which 66 cases fulfilled the inclusion criteria, hence; were subjected to clinical & laboratory investigations, 32 patients had abnormal values of investigative parameters and therefore excluded. Finally 34 cases were enrolled. A total of 30 cases completed the trial as 4 cases lost to follow up.

Out of the 30 subjects maximum 14 (46.7%) were in the age group of 31- 40 years, followed by 11 (36.7%) patients and 5 (16.7%) patients in age group of 20-30 years and 41-50 years respectively, 20 (66.7%) were females 10 (33.3%) were males. In present study 26 (86.7%) subjects were Muslims and 4 (13.3%) were Hindus. In this study, 23 (76.7%) patients were married and 7 (23.3%) patients were

unmarried. 12 (40%) patients were housewife, 7 (23.3%) patients were businessman, 7 (23.3%) patients were employee and 4 (13.3%) were student i.e. maximum were from sedentary life style . The study showed that maximum 12 (40%) patients were from upper lower class (IV), followed by 9 (30%) patients were from lower middle class (III), 8 (26.7%) patients were from upper middle class (II), 1 (3.3%) patient in upper class (I), and no patient in lower class (V).

The objective parameters (Weight, BMI, Waist Circumference, Waist Hip Ratio, and Skin fold Thickness) were recorded at baseline, after 5th sitting and after completion and analyzed statistically before and after treatment. The Mean±SD score and their differences for Weight, BMI, Waist Circumference and Waist Hip Ratio at 0 day and 35th day were 87.51±8.46 and 84.62±8.42, (2.890), 33.00±1.69 and 31.90±1.69, (1.102), 107.86±7.22 and 106.26±7.29, (1.597) and 0.95±0.04 and 0.94±0.04, (0.008) respectively which were found statistically highly significant when assessed with Student's t-test (paired) ($p < 0.001$) as shown in Table no.1

The Mean±SD score and their differences for Skin fold Thickness (Mid Triceps, Biceps, Subscapular, Suprailiac and Summation of all four sites) were 22.91±4.91 and 21.33±4.88, (1.583), 15.70±3.73 and 14.43±3.76, (1.270), 28.19±4.19 and 26.44±4.06, (1.750), 28.07±4.89 and 26.49±4.75, (1.583) and 94.85±12.71 and 88.67±12.46, (6.173) respectively, which were found statistically highly significant when assessed with Student's t-test (paired). ($p < 0.001$) (Table No. 2). These correlates with the studies of Nazni et al, Kannan et al and Al-Zahrani in which weight, BMI, Fat of the body decreases when physical exercise done with diet control. When fat decreases, weight, BMI, Waist circumference, Waist Hip Ratio and Skin Fold Thickness will also decrease. [11,12,13]

Table 1: Descriptive Statistics of Test Regimen

Variables	BT	AT	Difference	P Value
Weight	87.51±8.46	84.62±8.42	2.890	<0.001**
BMI	33.00±1.69	31.90±1.69	1.102	<0.001**
WC	107.86±7.22	106.26±7.29	1.597	<0.001**
WHR	0.95±0.04	0.94±0.04	0.008	<0.001**

Student's t-test (Paired) (n= 30)

Table 2: Descriptive Statistics of Test Regimen (On Skin fold thickness)

Variables	BT	AT	Difference	P Value
Mid Triceps	22.91±4.91	21.33±4.88	1.583	<0.001**
Biceps	15.70±3.73	14.43±3.76	1.270	<0.001**
Subscapular	28.19±4.19	26.44±4.06	1.750	<0.001**
Suprailiac	28.07±4.89	26.49±4.75	1.583	<0.001**
Summation	94.85±12.71	88.67±12.46	6.173	<0.001**

Student's t-test (Paired) (n= 30)

Table 3: Descriptive Statistics of Test Regimen (On Safety Parameters)

Variables	BT	AT	Difference	't' Value	P value
SGOT (AST)	30.40±13.99	28.27±7.33	2.133	0.820	0.419
SGPT (ALT)	26.77±11.54	25.80±9.80	0.967	0.542	0.592
Total Cholesterol	191.47±39.31	214.60±38.98	-23.133	-3.913	<0.001**
Triglycerides	135.87±50.58	177.70±47.58	-41.833	-3.702	<0.001**
LDL	121.81±33.14	135.89±29.82	-14.080	-2.741	0.010
HDL	42.50±7.25	43.17±6.78	-0.667	-0.459	0.649

Student's t-test (Paired) (n= 30)

DISCUSSION

The basal metabolic rate (BMR) is the energy expenditure of lying still at rest, awake, in the overnight post absorptive state. [14] In obese persons due to lack of physical activity BMR decreases, resultantly excess fat accumulation increases in the body. BMR increases by doing physical exercise which increases the energy expenditure, consequently weight loss occurs. In obesity excess fat deposition occurs due to imbalance in daily energy intake (food) and energy expenditure. When the amount of energy taken (from food) exceeds the amount of energy needed for daily life activities then the extra amount of energy is stored in the body in the form of adipose tissue or fat, which ultimately cause obesity. This imbalance can be corrected by decreasing the daily energy intake to a considerable level without affecting the daily activities. This task may be gain by *Taqleel-e-Ghiza* (Diet control) to achieve the goal of overcoming the disease.

In Unani System of Medicine *Asbab* or the factors, which are precursors and have an influence on human body to generate a new state or maintain an old one are of prime importance. Everything depends on a cause for its occurrence, if

these causes are in favour of health is gained otherwise body is suffered with disease. It is supposed that there are six causes from which nobody can escape during whole life known as *Asbab-e-Sitta Zarooriya* (Six essential factors). [15] These are also responsible for preservation and transition of existing health as it covers whole life style factors. Modernization has changed the lifestyle of human being which increased the chances of developing certain abnormalities such as obesity, metabolic disorders etc. To prevent these abnormalities modifications in life style factors and change in life style is necessary and as these are all covered under *Asbab-e-Sitta Zarooriya* hence making balance in it will certainly give positive results According to *Zakariya Razi* and *Rabban Tabri*, *Ratab Aghziya* (Wet food) produces obesity much more rapidly than other diets. [5]

The first reference of obesity in medical context was given by *Buqrat* (Hippocrates 460 BC). [16] *Jalinus* says the chances of sudden death may increase in obese person because of haemorrhage or due to loss of *Hararat*. *Razi* has given details description of obesity and its management. According to him, the *Mizaj*

of obese person becomes *Barid*. In such condition the diet, drugs, exercise and *Tadabeer* of hot and dry *Mizaj*, should be prescribed. In *Simane Mufrit* three *Asbab* (Factors) from *Asbab-e-Sitta Zarooriya* get disturbed which are *Makool wa Mashroob*, *Harkat wa Sukoon-e-Badni* and *Ehtibas-o-Istifragh*. According to *Buqrat*, the *Kaifiyat* (Quality) and *Kammiyat* (Quantity) of diet and its balance diet is an important factor in the treatment of obesity. He further stated that one who wants to lose weight should take a diet which is low in calorie and rich in fiber. According to *Zakariya Razi* and *Raban Tabri*, *Kasrat-e-Ghiza* (Excessive eating) and *Roghaniyat* (Fatty oils) produce excessive *Balgham* (Phlegm) as well as disturbs the metabolism which may lead to excessive deposition of fat in the body. When this fat crosses the normal limit for a healthy person, it becomes the major cause of obesity. So in order to reduce the obesity one must take bulky food with least nutritive values and also avoid oily food and foods that produces more phlegm and blood. [5,15,17]

Physical activities such as *Riyazat* are very essential for the activation of *Hararat-e-Ghariziya* (Innate heat) and excretion of the waist products from the body. Rest is necessary to save the body temperature and body fluid. Excess of both causes coldness because excess motion decreases the *Rutubat-e-Ghareeziya* (Innate fluid) subsequently innate heat also decreases, the same way excess of rest increases the body fluid and coldness which decrease the *Hararat-e-Ghareeziya* (Innate heat) resulting in lower BMR and production and accumulation of extra fluid and phlegm which causes obesity. Therefore, in order to reduce weight the person must do *Riyazat* as it produces dryness in the body. It is one of the most important tools for reducing the obesity by expenditure of extra energy. Balance in *Istifragh* and *Ehtibas* is very important for maintaining bodily health. There is production of waste and useful products in the body after taking meal, so useful

products should retain in the body and waste products should eliminate from the body to maintain the homeostasis. In obesity, waste products are not completely excreted, creating disturbance in normal excretion and retention, this imbalance leads to blockage, heart attacks and many other complications.

Most of the Unani physicians consider *Hammam* therapy is the best treatment for *Simane Mufrit*, therefore they have given detailed description in their books. According to them *Hammam* produces diverse effects i.e. *Hararat* or *Burudat* and *Yabusat* or *Rutubat*, it totally depends on duration of stay in *Hammam* and use of hot air and hot water or steam. It also opens pores of skin, do *Nuzj* in *Mawad* and facilitate its removal from the body. So the hypothetical mechanism of action of *Hammam* is supposed to work through its properties of *Tahleel*, *Taqtee'* and *Talteef*. The selected regimen, consisting of *Riyazat* (Physical exercise) and *Hammam-e-Bukhari* (Steam bath) with *Taqleel-e-Ghiza* have significantly reduced the weight in this study, this may be attributed to the cumulative effect of *Hammam*, exercise and diet control and strongly suggest that the regimen have potential to treat obesity, validating the their efficacy of this clinical trial. [18,19]

In Safety parameters there was statistically no significant difference in SGOT and SGPT before and after the treatment (Table No.3). In lipid profile (Total cholesterol, Triglycerides, LDL), mean differences were (-23.133, -41.833, -14.080) respectively (Table No 3). There was significant difference on means before and after treatment. This increase in values of total cholesterol, triglycerides and LDL is contrary to the reports of other studies where values of lipid profile were decreased after exercise and diet control i.e. after life style modification. However, no such data is available for Total cholesterol, triglycerides and LDL in relation to *Hammam* intervention. The value of HDL found increased with mean difference of (-0.667) (Table No.3), but statistically was not

significant, while other studies reports significant increase in HDL after exercise and diet control. However, like other lipids no such data is available for HDL in relation to Hammam intervention. [11,12,13,20]

In spite of good results in efficacy parameter i.e. weight, BMI, WC, WHR, skin fold thickness, why there was increase in lipid profile, could not be explained in the concept frame of conventional system of medicine. But it can be easily correlated with classical Unani literature where renowned Unani physicians described that, after doing *Riyazat* and *Hammam*, *Tahallul* of morbid matter i.e. *Balghami Madda* (dissolution of fat molecules) occurs which ultimately comes in blood circulation, before being excreted through its natural roots, this may be the reason of this increase in serum lipid. [18,21,22] Several studies support our contention that dietary modification reduces energy intake and thereby reduces body weight. Further, scientific studies revealed that, increased physical activity balances energy expenditure and increases the basal metabolic rate (BMR) which results in decrease body weight. [23]

As it has been claimed by several renowned Unani Scholars in their books that *Hammam* significantly reduces weight, the same has been proven by the result of this study. [5,15,21,22] The hypothesis formulated that *Riyazat* and *Hammam-e-Bukhari* with *Taqleel-e-Ghiza* will significantly reduce the weight, seems to be valid. Since the obesity is a chronic disease and develops due to deposition of excessive fat, the dietary restrictions and *Riyazat* increases the consumption of body fat thereby helpful in reducing body weight, on the other hand *Hammam-e-Bukhari* evacuates the morbid matter particularly *Balghami Maada* from the body through sweating. Hence, the effect in test regimen is a cumulative effect of *Riyazat* (Physical Exercise), *Hammam-e-Bukhari* (Steam Bath) as well as the effect of *Taqleel-e-Ghiza* (Diet Control). In the light of above discussion it can be concluded that the test regimen possesses

significant anti obesity activity without demonstrating any substantial side effects.

CONCLUSION

Simane Mufrit (Obesity) is a chronic pathological condition and a risk factor for type 2 diabetes and several cardiovascular diseases (CVD). Obese people have a greater probability than normal-weight people of developing metabolic syndrome, a condition characterized by high blood pressure, insulin resistance and dyslipidemia. Any intervention meant for treating obesity should focus on that how to restore balance between daily energy intake and energy expenditure. These interventions can be divided into three parts: diet modifications, improvement in physical activity, and clinical interventions. Presently available treatment is primarily based on dietary modification, exercise, drug therapy and surgical interventions. It is more exciting that Unani system of medicine offers some potential regimens for management of *Simane Mufrit*. However, the hidden potential of these regimens could not be explored on scientific parameters.

As objective Parameters, Weight, BMI, Waist circumference, Waist hip ratio and Skin fold thickness were recorded before treatment, after 5th sitting and after completion of treatment. SGOT, SGPT and Lipid profile (total cholesterol, triglycerides, LDL and HDL) as safety parameter were assessed before and after treatment. Pre and post treatment scores of different parameters (objective and safety) were assessed and subjected to statistical analysis to evaluate the efficacy of test regimen. There was clinically and statistically significant improvement in objective parameters, (weight, BMI, WC, WHR, Skin fold thickness). Although a significant difference in pre and post values of total cholesterol, triglycerides and LDL were noted, but still the values were within normal limits hence it may be concluded that the regime is apparently safe.

The use of these regimens for *Simane Mufrit* (Obesity) was based on the

principles of *Kasrat-e-Istifragh* (Excess Evacuation) of accumulated morbid matter i.e. fat (*Balghmi Maadda* or *Shahmi Madda*) by *Tahleel* with *Riyazat* (Physical exercise) and *Ta'reeq* with *Hammam-e-Bukhari* (Steam Bath) and reduction in the daily energy intake (*Taqleel-e-Ghiza*). It may be concluded here that the test regimens comprising *Riyazat* and *Hammam-e-Bukhari* with *Taqleel-e-Ghiza* were found effective in reducing obesity without any substantial adverse effect. As this study had constrain of time and resources, the sample size and duration of study are short, therefore studies with large sample size and prolong duration with longer follow ups are needed to further ascertain the efficacy and safety of the test regimen.

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