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• Instructions to Contributors

Editorial

Herbs produce a diverse range of bioactive molecules, making them a rich source of different types of medicine. However, a regular and widespread use of these herbs has increased serious concern over their quality, safety and efficacy. Thus, there is a need of a proper scientific evidence for worldwide acceptance of herbal health claims. Therefore, in recent years, a large number of traditional drugs, mainly herbal, have been subjected to clinical, pharmacological, phytochemical and pharmaceutical studies in an effort to validate them and prove their medical efficacy and safety. Over the years, all these investigations have yielded extensive and valuable findings and insights, and there is a need for wide exchange of this information among scientists engaged in the development of new drugs of natural origin.

Unani system of medicine, although originated in Greece, is one of the recognized systems of medicine of the country. Although, the Unani medicine have been in use for centuries and are known for their therapeutic efficacies, there is a need to scientifically establish their efficacy and safety in order to achieve global acceptance. Organized research work in this system was, therefore, a need of the hour. In post independent era, Central Council for Research in Unani Medicine, through its clinical, drug research, literary research, survey & cultivation of medicinal plants programme is contributing significantly for last three decades. Vitiligo, Sinusitis, Filariasis, Eczema, Malaria, Infective Hepatitis, Asthma, are some of the conditions where Unani therapies have earned recognition after scientific validation.

The Council has been publishing the peer reviewed Hippocratic Journal of Unani Medicine (HJUM), mainly to bring out fundamental and applied aspects of Unani Medicine. The journal also publishes recent advances in other related sciences and traditional medicines as well as different streams of medical sciences, which have bearing on validation and scientific interpretation of various concepts and strengths of Unani medicine.

In view of an overwhelming response, the journal earlier published twice a year, its periodicity has now been changed to quarterly w.e.f. January 2008 to accommodate more articles for quick dissemination of research data among scientific community. The journal has sufficient room for invited articles from luminaries of modern medicine and sciences as well as scholars of Unani medicine. The broad areas being covered include clinical research on single and compound Unani drugs, validation of regimental therapy, Clinical and experimental pharmacological studies, standardization of single and compound drugs, development of standard operating procedures, ethnobotanical studies, experimental studies on medicinal plants and development of agro-techniques thereof, and literary research on classics of Unani medicine. The journal is also open for studies on safety evaluation of Unani and other herbo-mineral drugs, nutraceuticals, cosmotherapeutics, aromatics, oral health, life style disorders, sports medicine etc. and such other newer areas which are the outcome of modern day living.

The current issue of this journal provides 12 original and review papers in the areas of clinical research, drug standardization, pharmacology, ethnobotanical surveys and allied disciplines contributed by eminent scholars in their respective fields. It is hoped that data presented will contribute significantly in R&D sector of traditional drugs and prove to be an excellent exposition of current research efforts of scientists in this direction. Council acknowledges the authors for their contributions included in this issue and hope for their continued support in this endeavor. We wish to ensure the readers to bring out the future issues of the journal on time.

We at the CCRUM have been constantly striving to reach to higher standards and make HJUM the leading journal of Unani Medicine and related sciences. In this context, we thank our learned reviewers for their invaluable inputs in improving the manuscripts. We sincerely hope and trust that the mission can be accomplished with active partnership of quality-conscious individuals and institutions. Through these lines we seek your cooperation and support in materializing our dreams about the HJUM. In this regard, we request you for your as well as your colleagues' contributions for publication in and subscription to the journal. Further, we will appreciate if the journal is introduced far and wide. We would also welcome esteemed suggestions for achieving the highest standards of quality for the journal.

(Prof. S. Shakir Jamil) Editor-in-Chief

Study of Knowledge, Attitude and Practice (KAP study) on Hijamah (Wet Cupping) Therapy

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Abstract

n Unani System of medicine for restoration of health three basic methods of treatments are provided. These are Regimenal therapy, Diet-o-therapy and Pharmacotherapy. Regimenal therapy is widely adopted for management of various diseases. It includes Hijamah (dry & wet cupping), massage, veinesection, leeching and cauterization. "Hijamah" has originated from the Arabic word "Hajm" meaning "sucking". Hijamah is a method of relieving local congestion by applying a partial vacuum that is created in a cup(s), either by heat or by suction. In Hijamah Bil shurt blood is sucked after applying cups to specific areas of the body. Hijamah therapy has strong connotation with Islam. Various Hadith are present in reference to this therapy. The Prophet (PBUH) explained that: "The best medicine with which you treat yourselves is Hijamah, or it is one of the best of your medicines (Al Bukhari, 5371). Hijamah therapy has been used since ancient times in Muslim countries and by Muslim community. However, currently it is also practiced in countries like China, Germany, United State, Australia, Fin land, Vietnam. In India also this therapy has been gaining popularity. To know about the perception of people about this therapy, a Study of Knowledge, Attitude and Practice (KAP study) on Hijamah (wet cupping) therapy has been carried out. The study reveals that more males than females attended the clinic for Hijamah therapy. Awareness about Hijamah was comparable in both, males and females, being 63.4% and 66.7% respectively.

Key words: Unani System of Medicine, Regimenal therapy, Hijamah, KAP study.

Introduction

Population in developing countries largely lacks access to essential therapies hence they seek health care from alternative system of medicine (Pal, 2002). Alternative medicine comprises organized medical wisdom and philosophical systems like Ayurveda, Yoga, Unani, Siddha and Homeopathy etc. In Unani system of Medicine, three basic methods of treatment viz. Diet-o-therapy, Pharmacotherapy, Regimenal therapy have been used. In this system of medicine Regimenal therapy is widely adopted for management of various diseases. The modes of regimental therapy are Hijamah (dry & wet cupping), massage, leeching and cauterization (Hamdani, 1980). KAP-Knowledge, Attitude, Practice, studies have widely been used to provide

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information about what people know, how they feel and how they behave and act on their feelings. These studies are highly specific, limited in scope and focused on specific health related subjects. Many such studies (more than four hundred) have been used widely in public health service since last forty years. Commonly they are used to assess the utilization and health seeking behavior of communities (Singh, 1994). The present study was thus carried out to ascertain the knowledge, attitude and practice of Hijamah (wet cupping) therapy.

Cupping: Cupping (Hijamah) was greatly advocated by Galen and Hippocrates-Father of medicine (361 B.C.) (Brockbank, 1987; Cule, 1980). "Hijamah" has originated from the Arabic word "Hajm" meaning "sucking". Cupping is a method of relieving local congestion by applying a partial vacuum that is created in a cup(s) (Fig. 1-3), either by heat or by suction (Bayfield, 1839). In Wet cupping blood is sucked after applying cups to specific areas of the body (Cui and Zhang, 1989). Hijamah therapy has strong connotation with Islam. Various Hadith are present in reference to this therapy. As quoted in Sahih Muslim, the Prophet (PBUH) explained that: "The best medicine with which you treat yourselves is Hijamah, or it is one of the best of your medicines (Rippin and knappert, 1986). In Egypt cupping was used for curative as well as for preventive purpose. This method of treatment in multiple forms spread into medicine throughout Asian and European civilizations (http://simplyhijama. com).

In the West, cupping therapy was a part of the basic clinical skills of a doctor until the latter part of the 19th century (William, 2001). Some Eastern European countries such as Poland and Bulgaria have continued to practice cupping therapy till today (http://wikipedia.org). Currently cupping therapy is widely practiced in India in major cities like Delhi, Mumbai, Hyderabad, Calicut, Pune, Aligarh, etc.

All medical professionals have distinguished two types of cupping – dry and wet. While Italian physicians favored dry cupping, European and American doctors used wet cupping, which was widely used in western hospitals till 1832.Wet cupping which is more common, in general is a curative approach to disease management whereas dry cupping produces preventive and relaxation effect. Preference varies with practitioners and cultures. (http://www.britishcuppingsociety.org, 2008).

Hijamah Bil shurt (Wet cupping): The first documented uses of Hijamah was found in the teachings of Prophet Muhammad (P.B.U.H.) (Dawud, YNM;



Muslim, YNM). Ibn 'Abbas (may Allah be pleased him) reported that the Prophet (peace and blessings of Allah be upon him) said: "Healing is to be found in three things: drinking honey, the knife of the cupper, and cauterization of fire (Al-Bukhaari, 10/136)." Abu Hurayrah (may Allah be pleased with him) reported that the Prophet (peace and blessings of Allaah be upon him) said: "Whoever is treated with cupping on the seventeenth, nineteenth or twenty first (of lunar month), will be healed from all diseases (Abu Dawood, 3861; Al-Bayhaqi, 9/340)" The isnad is hasan).

- Hijamah comes from the root al-hajm, which means "sucking", and is used of the action of draining the breast when an infant is suckled.
- Al-hajam is the name given to the cupper.
- Hijamah is the name given to this profession.
- Al-mihjam is the name given to the tool in which blood is collected, or to the knife used by the cupper.

In this alternative form of bloodletting or medicinal bleeding, also called blood cupping, multiple small scratch or incision is made with a lancet prior to the cupping, and the pressure difference extracts blood from the skin (Rippin and Knappert, 1986). Islamic traditional medicine uses this technique. As a result, the practice of cupping therapy has survived in Muslim countries. Hijamah therapy has been used since ancient times in Muslim countries and by Muslim community. However, currently it is also practiced in countries like China, Germany, United States, Australia, Finland, Vietnam (http:// www.healincupping.com/ review.htm). In India also this therapy is gaining popularity. To know about the perception of people about this therapy a Study of Knowledge, Attitude and Practice (KAP study) on Hijamah (wet cupping) therapy has been carried out.

Historical Cups:





Modern Cups:



Fig. 1

Fig. 2

Fig. 3

Methodology

A well designed KAP study was done on 62 normal healthy individuals of either sex attending Herbs and Hakim Clinic during the year of 2011-2012 on 17th, 19th and 21st dates of lunar month. Permission was obtained from the ethical committee. The subjects were assured about the confidentiality of the information and their written consent was taken. A structured standardized questionnaire was prepared after consulting experts in the field. It was also translated into local language. Pilot study was carried out and based on the observations and feedback final questionnaire was designed. The investigators were trained for uniformity in collecting data by interviewing. The data collected were scrutinized and systematically organized. Analysis of data were done using SPSS statistical software by statistical professionals. Data presented are in the form of appropriate tables. The tables and their interpretation are presented as follows:

Results and Discussion

Demographic Data

Age (yrs)	Males	%	Females	%
19-29	9	21.9	6	28.6
30-39	17	41.5	5	23.8
40-49	10	24.4	5	23.8
50-60	5	12.2	5	23.8
Total	41	100	21	100

Table 1: Distribution of Studied Population According to Age and Sex

Comments: The study reveals that more males than females attended the clinic for Hijamah therapy. The age range was from 19 to 60 Yrs.



Religion							
Muslim Hindu Christian Total							
No.	%	No.	%	No.	%	No.	%
60	96.8	1	1.6	1	1.6	62	100

Table 2: Distribution of Studied Population According to Religion

Comments: As expected most of the patients were Muslims, i.e. 96.8%. There was only one Hindu and one Christian patient, from a total of 62 patients.

Knowledge, Attitude and Practice Study Data

Knowledge

Table 3: Prevalence of Awareness about Hijamah in Studied Population

Awareness	Ма	lles	Fem	ales
	No. %		No.	%
Yes	26	63.4	14	66.7
No	15	36.6	7	33.3
Total	41	100	21	100

Comments: Awareness about Hijamah was comparable in both, males and females, being 63.4% and 66.7% respectively. Lack of awareness about Hijamah was observed in 22 individuals out of 62.

 Table 4:
 Distribution of Studied Population According to Reason for Opting for Hijamah

Reason for Opting for Hijamah	Sugge: som	Suggested by someone		Self Decision		Religious consideration	
	No.	%	No.	%	No.	%	No.
Males	5	12.2	9	22	27	65.8	41
Females	4	19	5	23.8	12	57.2	21

Comments: Religious consideration was the main reason for opting for Hijamah therapy. This may be due to the fact that most of the respondents were Muslims.

Attitude

Attitude to undergo Hijamah	Males		Females	
	No. %		No.	%
Positive	41	100	21	100
Negative	0	0	0	0
TOTAL	41	100	21	100

Table 5: Distribution of Studied Population According to Attitude to Undergo Hijamah Therapy

Comments: After explaining the procedure the attitude to undergo Hijamah was favorable in 100% respondents.

Practice

All the respondents underwent the procedure of Hijamah. They also accepted to repeat the procedure as per schedule, allocated by the Unani physicians. Hence, acceptance rate was 100%.

Conclusion

There is a revival of interest in alternative systems of medicine, like the Unani system, both by the Government and by the public. Hence, a KAP (Knowledge, Attitude, Practice) study was done to explore the various dimensions of community concepts of Hijamah. This procedure has a religious significance in Islam and was advocated by Prophet (P.B.U.H.). Thus, as expected there was a high degree of awareness in Muslim patients attending the Herbs and Hakim Clinic. The study was carried out during the year 2011-2012. Total numbers of 62 patients were studied. In males awareness was 63.4% and in females it was 66.7% (Table-3). Religious ground was the main reason for opting Hijamah (Males - 65.8% and Females - 57.2% (Table-4). After explaining the procedure in detail by the investigators, the attitude survey revealed that, it was favorable in all respondents i.e. 100% (Table-5). This is further proved by the fact that ultimately all patients of the study programme underwent the procedure and expressed the desire to continue the recommended schedule. This preliminary exploratory study has revealed encouraging baseline data and we suggest more elaborate studies at community level.

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Clinical **Evaluation of** Anti-Hyperlipidaemic activity of a Unani formulation containing Ritha (Sapindus trifoliatus Linn), Methi (Trigonella foenumgraecum Linn) and Bartang (Plantago major Linn)

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Abstract

yperlipidaemia is a metabolic disorder. It produces diseases like atherosclerosis, coronary heart disease (C.H.D) etc, which has an irreversible & fatal systemic effect. Majority of conventional allopathic drugs such as Statins and Fibrates etc have various adverse effects. An effective, safer, cheaper and readily available solution is needed to deal with Hyperlipidaemia. A compound formulation was prepared for this clinical study containing Methi (Trigonella foenum-graecum Linn) seeds, Tukhme Bartang (Plantago major Linn) seeds and rind of Ritha (Sapindus trifoliatus Linn) fruit. Muqil (Commiphora mukul Hook ex Stocks) a gum resin was taken as standard drug. Patients were selected from OPD of Mohammadia Tibbia College and Assayer hospital, Malegaon (MS) and randomly divided into two groups 'A'and 'B'of 30 patients in each of either sex. In group 'A' test drug was given in a dose of 6.1 g. and in group 'B' standard drug Muqil (Commiphora mukul Hook ex Stocks) in the dose of 1 gm was given before meals, three times a day for the period of 60 days. Assessment of efficacy was done on the basis of lipid profile. Both the groups exhibited highly significant anti hyperlipidaemic activity (p<0.001) except HDL (High density lipoproteins) level in standard control group. Test drug reduced the total Cholesterol (14.69%), TG (Triglyceride) (26.81%), and LDL (Low density lipoproteins) level (18.98%) and increased the HDL level (10.05%). Possible lipid lowering action of the test drug may be attributed to different constituents, such as saponin, mucilage, fiber, etc. Test drug exhibited highly significant antihyperlipidaemic activity and is as effective as standard drug.

Key words: Anti-hyperlipidaemic activity, Primary hyperlipidaemia, Methi, Bartang, Ritha

Introduction

Hyperlipidaemia is a metabolic disorder characterized by an excess of plasma lipids including the glycolipids, lipoprotien & phospholipids. Obesity is not a prequisite for hyperlipidaemia, but majority of obese population are found to be hyperlipidaemic. Though it is an easily diagnosable disorder but its effect on various structures is multifactorial, irreversible & fatal. Its abnormalities lead to incurable diseases like coronary heart disease, atherosclerosis, ischaemic heart disease, myocardial infarction, chronic renal failure, pancreatitis, liver diseases etc (Christopher *et al.*, 1999; Panda, 2000; Alagappan, 2001; Shah, 2003). According to classical Unani concept all the white or colourless

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fluids of the body are categorised as Balgham (Phlegm) (Istiyaq, 1980), and fat falls in the category of Balgham, therefore hyperlipidaemia can be a phlegmatic disorder. The term hyperlipidaemia in Unani literature was found to be attributed to the accumulation of Akhlat-e-Ghaliza especially the Balgham-e-gair mehmooda obstructing (Tasaddud) the affected vessels (Uroog) in favourable conditions & thus pronounced atheromatous plaque. The derangement in the metabolism of Khilt-e-balgham affects not only the vascular system, but also cardiac, cerebral & renal system. (Mobin, 2004). The concept of dusumate akhlat exits in classical literature, which is responsible for the development of Salabate Sharaeen (Atherosclerosis) (Majusi, 2010) "Dosoomat" means "fatty", "oily" and "akhlat" means "Humour", beside this Samane mufrat (obesity) has been described by Unani physicians and etiological factors, clinical features, complications of Saman mufrat has been discussed in detail. It is also mentioned that the obese persons are more prone to cardiac diseases and cerebrovascular accidents, there are various causative factors and complications of Samane mufrat (obesity) which are similar to hyperlipidemia. Yaboosat, barooadat mizaj and Ghalbe sauda wa balgham is considerd a contributing factor for development of salabate sharain (Majusi, 2010; Ibn Sina, 980-1037 A.D.).

The conventional, allopathic treatments for hyperlipidaemia include 1) Statins 2) Fibrates 3) Bile acid sequestrant resins 4) Nicotinic acid & its derivatives 5) Fish oil 6) Probucol (Christopher *et al.*, 1999; Alagappan, 2001; Satoskar and Bhandarkar, 2001; Shah, 2003). But majority of these drugs have various adverse effects like headache, fatigue, insomnia, nausea, gastrointestinal disturbances, constipation, etc. (Satoskar and Bhandarkar, 2001). Methi (*Trigonella foenum–graecum* Linn), Tukhme Bartang (*Plantago major* Linn) & Ritha (*Sapindus trifoliatus* Linn) are well known drugs to the ancient Unani physicians, and Ritha is mention as Mushil-e-Akhlate-Salasa (Ghani, 1926; Khan, 1353; Ibn-al-Baytar, 1197-1248).

Keeping in view the reported pharmacological activities of these three drugs i.e. *Plantago major* Linn (Bartang) for its plasma lipids, cholesterol, triglycerides lowering activity in rabbits with experimental atherosclerosis (Maksyutina *et al.*, 1978; Newall Carol *et al.*, 1996), *Trigonella foenum graecum* (Methi) for its hypocholesterolaemic activity (Sharma, 1986; Ribes, 1987), hypoglycaemic activity (Mishkinsky *et al.*, 1967; Sharma, 1986.; Shani *et al.*, 1974), and references of Unani classical text for its beneficial effect in Balghami diseases (Ibn-al-Baytar, 1197-1248), and *Sapindus trifoliatus* Linn (Ritha) for its hypocholesterolaemic activity (Prajpati *et al.*, 2003) and it is mentioned that "it expels Safra, Sauda and Balgham through faeces" (Ibn-al-Baytar, 1197-1248),

used to cure tridosha (Kirtikar and Basu, 1991), it was considered interesting to combine these three drugs and evaluate this formulation clinically to present a safer, cheaper, readily available and highly effective Unani formulation. Muqil (*Commiphora mukul*) (gum resin) was taken as standard drug because of its proven hypolipidaemic activity in human beings (Kuppuranjan *et al.*, 1978; Malhotra and Ahuja, 1971; Malhotra *et al.*, 1977; Nityanand and Kapoor, 1971, 1973; Satyavati *et al.*, 1969).

Materials and Methods

Total sixty cases of primary hyperlipidaemia of age ranging between 20-80years of either sex were selected for the clinical study. They were divided into two groups 'A' & 'B' of 30 patients in each. The study was carried out at the Mohammadia Tibbia College & Assair Hospital, Mansoora Malegaon on O.P.D basis. Voluntary written consent was obtained from all participants.

Inclusion Criteria

- Diagnosed cases of primary hyperlipidaemia were selected for this clinical trial who were not on any hypolipidaemic drugs.
- Patient with serum triglycerides (TG) >160 mg/dl (male), >140 mg/dl (female) and LDL Cholesterol >150 mg/dl, Total Cholesterol >230 mg/dl was included in this study

Exclusion Criteria

- Secondary hyperlipidaemia
- Diabetes
- Severe active Coronary heart disease and ischaemic heart disease
- Alcoholism
- Pregnant women
- Patients with severe systemic disease, & organ failure were excluded.

A clear proforma was prepared. Clinical assessment was done for selection based on the following parameter. history, diet, symptoms: (Subjective Assessment: - Chest pain, palpitation, dyspnoea, giddiness, joints pain, increasing weight), Sign: - (Objective Assessment:-Increasing weight, premature arcus senilis, Xanthomas) (Christopher *et al.*, 1999; Panda, 2000;



Shah, 2003). Efficacy assessment was done primarily on the basis of lipid profile.

Investigations: All the patients were investigated for lipid profile,{Serum cholesterol, triglyceride HDL (High Density Lipoprotein), LDL (Low Density Lipoprotein) & VLDL (Very Low Density Lipoprotein), TC/HDL ratio (Total serum cholesterol & High density lipoprotein ratio) & LDL/HDL ratio (Low Density Lipoprotein & High Density Lipoprotein Ratio)}. Lipid profile was done by using enzymatic method (Fischabach, 2000). Patients were asked not to eat any food accepts water for 12-14 hrs before taking the blood sample. Blood pressure was also recorded.

The study was open, controlled, randomized case control study for the period of 60 days.

Test drug formulation is a non pharmacopoeal compound drug designed for this study containing Tukhme Bartang (*Plantago major* Linn) (seeds), Methi (*Trigonella foenum–graecum* Linn) (seeds), and Ritha (*Sapindus trifoliatus* Linn) (fruit rind), it was given in group A in the dose of 6.1gm (thrice a day) orally and dosage of drugs was fixed according to Unani text for *Plantago major* Linn (Bartang) 3g. (Hakeem, 1894; Khan, 1874), *Trigonella foenum-graecum* Linn (Methi) 3g. (Anonymous, 1987; Hakeem, 1894; Kabeeruddin, 2000; Rafiquddin, 1985; Lubhaya, 1977) and *Sapindus trifoliatus* Linn (Ritha) 100mg (Lubhaya, 1977). Standard drug Muqil (*Commiphora mukul* Hook.ex Stocks) an Oleo-gum-resin was given to Group B in the dose 1 g. three times a day orally (Hakeem, 1894; Kabeeruddin, 2000).

Muqil was powdered & filled in capsules; 1g. Muqil powder was filled in 2 capsules & given to patients of Group B (Standard control). Tukhme Bartang, Tukhme Methi, & post Ritha were powdered, and 6.1 gm powdered drug (dose) was given in different forms i.e. 3g. powder & 3.100 gm pills (9 pills) in single dose 3 times a day. Ritha was mixed in pills, to avoid its bad taste & nausificient properties. Pills were prepared manually using water as a binder.

Drugs to both groups were given three times a day before meal for a period of 60 days. The patients were advised to have fat free diet & mild walking during the trial, and were assessed on every 15 days of medication. All the patients were treated in the Out Patient Department. Investigations as mentioned earlier were done before, during and after the treatment. Drug compliance was monitored by checking the empty polythene sachet of drugs.

Each patient was recorded on a Performa, especially designed for the study. All base line assessments were taken on the day of inclusion (Day-0) in the study and a similar assessment was taken on Day-60 of treatment. (No separate base line observation was made beside observation for recruitment). The data of both the test and control groups were tabulated and statistically analyzed by calculating the mean and standard deviation (means \pm SD) followed by applying 't' test (paired) to the observations recorded at the end of the study (60 days) to determine statistical significance of the test drug (Mahajan, 2003). Findings were compared in each group.

Observations and Results

Sex wise distribution shows that out of 60 cases there were 36 male and 24 female (Table 1). in the age group of 20-40 no of cases were 25, In age group of 41-60 no of cases were 32, and in age group 61-80 no of cases were 03 (Table 2). Maximum no of cases 40 out of 60 had sedentary working style (Table 3). As many as 58 (96%) cases were taking mixed (vegetarian and non vegetarian) diet (Table 4). 20% had hypercholesterolaemia, 53.33% have hypertriglyceridaemia and 26.66% cases were with mixed type of hyperlipidaemia (Table 5).

Patients of both the group A and B have been investigated for parameters like lipid profile, before, during & after treatment during 60 days and statistical significance for test drug was determine for before and after treatment data. After 60 days of medication response of both the group i.e. group 'A' & group 'B' in decreasing the serum total cholesterol was (14.69% & 15.7%), TG (26.81% & 23.3%), LDL (18.98% & 19.54%) & VLDL (25.34%& 23.6%) respectively this reduction was significant (P< 0.001) in comparison to before treatment range (Base line). There was also an increase in the HDL in group A and B (10.05% & 3.92%) respectively but increase in HDL was not significant in group 'B' (control) (Table 6).

Sr. No.	Sex	No. of Patient	Percentage
1	Male	36	60%
2	Female	24	40%
	Total	60	100%



Sr. No.	Age group	No. of Patients	Percentage
1	20-40	25	41.6%
2	41-60	32	53.3%
3	61-80	03	5.0%
4	Total	60	100%

 Table 2: Distribution of patients according to their age:

 Table 3: Distribution of patients according to their profession

Sr. No.	Profession	No. of Patients	Percentage
1	Official	12	20%
2	Sedentary	40	66.6%
3	Hard workers	08	13.3%
	Total	60	100%

Table	4:	Distribution of	patients	according to	their	dietarv	habits
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Sr. No.	Dietary Habit	No. of Patients	Percentage
1	Veg.	02	3.3%
2	Mixed	58	96.6%
	Total	60	100%

Table 5: Distribution of Patients According to increase in type of plasma lipids i.e. Cholesterol, Triglyceride or mixed:

Plasma lipids elevated		Percentage		
	Group A	Group B	Total	
* Hypercholesterolaemia	06	06	12	20.00%
* Hypertriglyceridaemia	13	19	32	53.33%
* Mixed type	11	15	16	26.66%
Total	30	30	60	100%

Parameters	Test Drug (Group A)		Control Drug (Group B)			
	Before treatment At day-0	After treatment At day-60	% Change ↑ / ↓	Before treatment At day-0	After treatment At day-60	% Change ↑ / ↓
Total cholesterol mg/dl	229.4 ± 29.9	195.7 ± 21.6*	14.69% Reduction	228.8 ± 46.8	192.7 ± 22.1*	15.7% Reduction
Triglycerides mg/dl	181.6 ± 32.1	132.9 ± 30.2*	26.81% Reduction	198.9 ± 49.4	152.5 ± 34.3*	23.3% Reduction
HDL mg/dl	40.1 ± 5.9	44.2 ± 6.4*	10.05% Increase	39.79 ± 9.11	41.35 ± 8.3	3.92% Increase
LDL mg/dl	153.3 ± 26.5	124.2 ± 16.4*	18.98% Reduction	150.9 ± 44.32	121.4 ± 20.75*	19.54% Reduction
VLDL mg/dl	36.6 ± 6.4	27.1 ±4.6*	25.34% Reduction	39.8 ± 10.3	30.4 ± 7.06*	23.6% Reduction
TC/HDL ratio	5.7	4.4	22.8% Reduction	5.8	4.73	18.4% Reduction
LDL/HDL ratio	3.7	2.79	24.59% Reduction	3.8	2.93	22.89% Reduction

Table 6: Effect of Drugs on serum lipids

Statistical method used, mean \pm standard deviation and paired "t" test P*< 0.001 as compare to before treatment value, (n=30)

Discussion

Majority of cases of hyperlipidaemia were from in the age group of 41-60 and had sedentary life style. Most of the cases were of hypertriglyceridaemia and decrease in TG level was also significant in this study. Possible lipid lowering action of test drugs might be attributed to several constituents of these drugs such as; 1) high concentration of saponin in fruit rind of Ritha. (Kirtikar and Basu, 1991; Rastogi and Mehrotra, 1990, 1995) (Saponin are bile acid sequestrant they combine with bile acids (bile acids are formed in the liver from cholesterol) & retard their re-absorption there by evacuating out lipid through the feces & reduce the plasma lipid levels) (Malinow, 1977; Oakenfull, 1979); 2) mucilaginous fiber & saponin fraction in Methi (Rastogi and Mehrotra, 1993,1995) retard the absorption of fat whereas fiber are not absorbed and form a bulk in intestine, its steroidal saponins also reduces cholesterol (Petit *et al.*, 1995), beside this, it also contains alkaloids (Mainly trigonelline) & protein high in lysine, L-tryptophan, methionine, Vit B (Nicotinic acid) which has lipolytic activity (Anonymous, 2005; Evans, 2002; Kolousek and Coulson,



1955; Lakshmiah and Ramshastri, 1969); 3) Mucilage content in Bartang (Chopra, 2002; Evans, 2002; Khare, 2004; Anonymous, 2005) reduces serum Cholesterol (Maksyumtina, *et al.*, 1978; Newall, 1996) and can also act as corrective (Musleh) for the saponin (GIT irritation if any in given dose).

Both the drugs of group A & B were well tolerated, one of the drugs in formulation Ritha (Rind Powder) has been used in formulation named Habbe Ritha mention in Qarabadeene sarkari Unani Andhra pradesh for piles since long time (Anonymus, 1988). According to Dymock (1890) *"we have no record of the use of this fruit (Ritha) as a poison for human being, doses of 70 grain (4.53g.) and more appear to have no injurious effect upon the system when taken as purgative"* quantity used in our study is very less.

Test drug formulation had great potential in reducing TG, VLDL and LDL & increasing good cholesterol HDL. One important finding was that HDL level was significantly increased in test group i.e. group A (10.05%) while in group B i.e. standard group HDL level did not increase significantly (only 3.92%) when compared with baseline plasma lipid levels. Lipid imbalance is highly associated with insulin resistance, obesity and diabetes, and studies suggest that many subjects with low HDL level and those with high triglyceride level can also be insulin resistant. (Ginsberg, 2000; Markku, 2004) This means that they are unable to effectively used insulin, which is essential for regulating the storage & use of glucose (Sugar) & amino acids (proteins) in the body. It is now believed to be a major risk factor for the heart disease. Test formulation may be having some role in insulin stimulating activity & research had shown hypoglycemic activity in the drugs present in formulation. In Methi the fraction producing the hypoglycaemic effect is also responsible for its hypocholestrolaemic effect (Puri et al., 1994). Further test formulation reduces TC / HDL ratio upto 22.8% which is a major coronary risk factor, decrease in TG & increase in HDL was highly significant in group A (test group). These effects may be due to the combination of Ritha with Methi which would have potentiated its action. Reetha used in this formulation can be of great potential as an anti - Hyperlipidaemic for which it has not been used so far. And this work might also help to validate classical Unani claims about the action of Ritha that it excretes Khilt-e-Balgham through faeces (Ghani, 1926). Results of improvement in test drug are similar to control (standard) drug Muqil. Above mentioned findings of this formulation need further evaluation, also comparative study with Fibrates & Bile acid binding resins is needed.

Conclusion

It may be concluded that the effect of the test formulation in lowering the level of serum total cholesterol, serum triglycerides, serum LDL, serum VLDL and increasing the level of serum HDL is significant in patients of primary hyperlipidaemia, Highly significant reduction in TG & HDL level in group A (test group) was noted.

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Comparative Efficacy of Unani Drugs in the Management of Zight-uddam Qawi Ibtidai (Primary Hypertension)

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Abstract

ight-ud-dam qawi ibtidai (Primary hypertension) is a disorder affecting the population at large. According to British Hypertension Society, hypertension is the level that exceeds the high normal level of 140/90 mmHg. Six Studies from different institutions were taken to compare their efficacy in the management of this disorder with Unani Drug combinations. Though all the drug combinations i.e. (i) Itrifal Kishneezi; (ii) Khameera Sandal Sada; (iii) Qurs Dawaus Shifa; (iv) Safoof-e-Kahu-Khar Khasak; (v) Safoof-e-Khashkhash & Sharbat-e-bazoori motadil and (vi) Safoof-e-Musakkin were proven to be effective but the most effective combination to normalise systolic blood pressure was found to be Safoof-e-Kahu-Khar Khasak while the most effective combination to normalise diastolic blood pressure as well as the symptomatology was found to be Safoof-e-Musakkin. Thus, after comparing the efficacy of all the Unani drugs combinations, 'Safoof-e-musakkin' can be proposed to be the most effective Unani drug combination to be used for the management of zight-ud-dam qawi ibtidai, with best results.

Keywords: Zight-ud-dam qawi ibtidai, Itrifal Kishneezi, Khameera Sandal Sada, Qurs Dawaus Shifa, and Asrol.

Introduction

According to British Hypertension Society, hypertension is the level that exceeds the high normal level of 140/90 mmHg. It is categorised into 'grade I' (140-159/90-99 mmHg), 'grade II' (160-179/100-109 mmHg) and 'grade III' (≥180/≥110 mmHg) (Nicki, 2010). Hypertension develops due to alteration in Cardiac output, Viscosity of blood, Quantity of blood, Peripheral resistance and Elasticity of arterial wall (Best and Taylor, 1970). Clinical features that are mainly attributed to hypertension are headache, palpitation, fatigability, dizziness, dyspnoea on exertion, sleeplessness and mental stress etc. Almost the same concept is described in Unani literature under the headings of Imtila, and Salabat-e-Sharyan. Now the term Zight-ud-dam qawi has been coined for hypertension. The most important cause of hypertension is Imtila-e-Dam, which is of two types:

- 1. Imtila-e-dam bahasbul auiya
- 2. Imtila-e-dam bahasbul quwa

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In Imtila-e-dam bahasbul auiya there is raised blood volume resulting in increased vascular pressure. This type of imtila is due to excess accumulation of metabolic products, whether mahmooda (beneficial) or ghair mahmooda (harmful), and this type of congestion is common in obese people (Kantoori, 1889, 1896).

In Imtila-e-dam bahasbul quwa, faculties like quwwat-e-nafsaniya, quwwat-emudabbara badan and quwwat-e-tabia of body are disturbed. Among them, disturbance of quwwat-e-tabia leads to altered digestion resulting in production of harmful by-products. Similarly disturbed quwwat-e-nafsaniya and quwwat-emudabbira badan also weaken body systems at the level that a small quantity of toxin/ harmful by-products may produce symptoms of imtila (Kantoori, 1889, 1896).

A general guideline for the management of hypertension should be as follows:

- 1. Salt restricted diet
- 2. Weight reduction of obese and overweight
- 3. Regular physical activity
- 4. Cessation of alcohol intake and smoking
- 5. Stress reduction and to provide happy environment

Drug therapy includes the use of:

- Musakkin or Moaddile Jazbat (Tranquilizers): Khashkhash, Bekh-e-Asrol, Tukhm-e-Kahu, Kishneez
- 2. Mudir-e-baul (Diuretics): Khar-e-Khasak, Tukhm-e-Gazar, Tukhm-e-Turab, Tukhm-e-Khayarain, Sharbat-e-Bazoori, Sharbat-e-Anannas
- 3. Musaffy/ Moaddile Dam (Blood Purifiers): Sandal, Chiraita, Unnab,
- 4. Mufatteh urooq (Vasodilators): Asrol, Kasni, Karafs, Revand chini
- 5. Muqawwi Qalb (Cardiotonic): Abresham, Yashab, Marwareed
- 6. Muqawwi Quwa Mudabbira badan wa quwa tabiya: Marwareed, Gauzaban

Observations and Results

Effect of test drug combinations on systolic blood pressure

The test drugs Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil showed 27mm of Hg, Itrifal Kishneezi 24.45 mm of Hg, Safoof-e-Kahu-Khar Khasak

30.6 mm of Hg, Safoof-e-Musakkin 22.7 mm of Hg, Khameera Sandal Sada 14.4 mm of Hg, and Qurs Dawaus Shifa 27.7 mm of Hg improvement in systolic blood pressure (Table-2).

Among them Safoof-e-Kahu-Khar Khasak had shown maximum improvement followed by Qurs Dawaus Shifa then Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil while Khameera Sandal Sada had shown least improvement in systolic blood pressure.

Effect of test drug combinations on diastolic blood pressure

The test drugs Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil showed 11.1 mm of Hg, Itrifal Kishneezi showed 14.93 mm of Hg, Safoof-e-Kahu-Khar Khasak showed 15.7 mm of Hg, Safoof-e-Musakkin showed 16.3 mm of Hg, Khameera Sandal Sada showed 9.2 mm of Hg and Qurs Dawaus Shifa showed 10.72 mm of Hg improvement in diastolic blood pressure (Table-3).

Among them Safooe-e-Musakkin showed maximum improvement, followed by Safoof-e-Kahu-Khar Khasak then Itrifal Kishneezi, while Khameera Sandal showed least improvement in diastolic blood pressure.

Effect of test drug combinations on symptoms

Headache was improved in 52% cases by Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil, 80% cases by Safoof-e-Kahu-Khar Khasak, 91.7% cases by Safoof-e-Musakkin 79.2% cases by Khameera Sandal Sada, 82% cases by Qurs Dawaus Shifa.

Palpitation was improved in 40.75% cases by Safoof-e-Khashkhash & Sharbte-Bazoori Motadil, 86.95% cases by Itrifal Kishneezi, 81.81% cases by Safoofe-Kahu-Khar Khasak, 96% cases by Safoof-e-Musakkin 77.3% cases by Khameera Sandal Sada, 88% cases by Qurs Dawaus Shifa.

Fatigability was improved in 50% cases by Safoof-e-Khashkhash & Sharbte-Bazoori Motadil, 88.88% cases by Itrifal Kishneezi, 75% cases by Safoofe-Kahu-Khar Khasak, 94% cases by Safoof-e-Musakkin, 47.3% cases by Khameera Sandal Sada and 79% cases by Qurs Dawaus Shifa.

Dizziness was improved in 50% cases by Safoof-e-Khashkhash & Sharbte-Bazoori Motadil, 37.5% cases by Itrifal Kishneezi, 75% cases by Safoofe-Kahu-Khar Khasak, 92% cases by Safoof-e-Musakkin, 61.9% cases by Khameera Sandal Sada and in 88% cases by Qurs Dawaus Shifa. Exertioinal dyspnoea was improved in 12.5% cases by Safoof-e-Khashkhash & Sharbt-e-bazoori motadil, 57.89% by Itrifal Kishneezi, 75% by Safoof-e-Kahu-Khar Khasak, 84% by Safoof-e-Musakkin, 33.3% cases by Khameera Sandal Sada and 82% by Qurse Dawaus Shifa.

Sleeplessness was improved in 93.3% cases by Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil, 91.89% by Itrifal Kishneezi, 80% by Safoof-e-Kahu-Khar Khasak, 95.7% by Safoof-e-Musakkin, 76.5% by Khameera Sandal Sada and 84% by Qurs Dawaus Shifa.

Mental stress was improved in 95.8% cases by Safoof-e-Musakkin, while 78% cases by Qurs Dawaus Shifa

The most effective Unani drug combination to improve the overall symptomatology was found to be the combination 'Safoof-e-Musakk' having Bekh-e-Asrol, Kishnieez Khushk and Filfil Siyah; second to this was the drug Qurs Dawaus Shifa, while least effective drug combination was 'Safoof-e-Khashkhash' & 'Sharbt-e-Bazoori Motadil'.

Discussion

The test drugs used for the management of hypertension mainly have Musakkin, Mukhaddir, Mufarreh, Munawwim, Mudir-e-Baul, Muftteh Urooq, Dafe Khafqan, Dafe Suda, Mubarrid, Muqawwi qalb wa dimagh effects. The studies conducted have different combinations having the drugs which possessed the above mentioned effects. Therefore all the test drug combinations have proved effective in the ailment.

The most effective drug combination was found to be the combination No 4. (Table-1) This combination showed maximum effect to reduce diastolic blood pressure (Table-3) as well as to improve the symptomatology (Table-4). The mechanism of action of the combination can be attributed to the effects of the drugs present in it like Musakkin, Munawwim, Musakkin Alam, Dafe Fisharuddam, Mukhaddir of Asrol (Anonymous, 1969; Chopra, 1958; Goswami, 1977) Mufarreh, Muqawwi qalb wa dimagh, Dafe Khafqan, Dafe Suda, Mudir baul, Munawwim, Mubarrid, Dafe fisharuddam of Kishneez Khushk (Kirtikar, 1996; Anonymous, 1950) and Musakkin alam, Muqawwi asaab, Mudir, Jaali, Mukhaddir, Musleh of Filfil Siyah (Anonymous, 1969; Kirtikar, 1996).

Second most effective combination was found to be the combination No 3 (Table-2). This combination was most effective on systolic blood pressure while second most effective on the diastolic blood pressure. The symptoms



like headache, palpitation, sleeplessness were responded well with this combination and on some other symptoms the effect was average. This overall effect matches with the effects of Tukhm-e-Kahu (sedative, hypnotic, cooling, aesthetic, blood Purifier) (Khan, 1895; Nadkarni, 1954; Kirtikar and Basu, 1987; Chopra, 1956) and Khar Khasak (mubarrid, musaffi dam, musakkin alam, and antidote) (Khan, 1895; Nadkarni, 1989; Kirtikar and Basu, 1987; Chopra, 1958). Apart from the above, Tukhm-e-Kahu and Khar Khasak also possesses mudir-e-baul (diuretic) effect that leads to systolic antihypertensive effect by decreasing the blood volume (Nadkarni, 1954; Anonymous, 1962; Chopra, 1956; Kirtikar and Basu, 1987; Khan, 1895).

Third most effective combination was found to be the combination No. 6. (Table- 2) This drug showed appreciable effect in reducing systolic blood pressure to a greater extent (Table- 3) along with improving the symptomatology (Table- 4). This effect of the drug may be due to vasodilator effect of the main constituent Asrol (Bhatia, 1942).

Rest of the other combinations too have antihypertensive effects on symptomatology as well as on the levels of blood pressure but comparatively they are not enough potent as above three, even though the combinations contain the drugs having Musakkin, Munawwim, Musakkin Alam and Mubarrid effects but do not have vasodilatation effect.

Drug Combination No.	Name of Test Drug Combination	Ingredients	Botanical Identity	
	Safoof-e- Khashkhash	Tukhm-e-Kahu	Lectuca sativa Linn.	
		Tukhm-e-Khurfa	Portulaca oleracea Linn.	
		Tukhm-e-Khashkhash	Papaver somniferum Linn.	
		Gul-e-Neelofer	Nymphea lotus Linn.	
		Kishneez Khushk	Coriandrum sativum Linn.	
1.	Sharbat- e-Bazoori Motadil	Tukhm-e-Khyar	Cucumis sativus Linn.	
		Tukhm-e-Kharpaza	Cucumis melo Linn.	
		Tukhm-e-Khyarza	Cucumis melo Linn. var. Utilissimus	
		Bekh-e-Kasni	Cichorium intybus Linn.	
		Tukhm-e-Kasni	Cichorium intybus Linn.	
		Bekh-e-Badyan	Foeniculum vulgare Mill.	

 Table 1:
 Test Drug Combinations Used

		Halaila	Terminalia chebula Retz.	
		Amla	Emblica officinalis Gaertn.	
		Kishneez	Coriandrum sativum Linn.	
2.	Itrifal Kishneezi	Turanjbeen	Alhagi maurorum Medik.	
		Badam Shireen	Prunus amygdalus Batsch.	
		Gul-e-Surkh	Rosa damascena Mill.	
		Usukhuddoos	Lavandula stoechas Linn.	
	Safoof-e- Kahu-Khar Khasak	Tukhm-e-Kahu	Latuca sativa Linn.	
3.		Khar Khasak	Tribulus terrestris Linn.	
	Safoof-e- Musakkin	Bekh Asrol	Rauwolfia serpentina Benth.	
4.		Kishneez Khushk	Coriandrum sativum Linn.	
		Filfil Siyah	Piper nigrum Linn.	
F	Khameera Sandal Sada	Sandal Safaid	Santalum album Linn.	
5.		Gul-e-Surkh	Rosa damascena Mill.	
6.	Qurs Dawaus	Asrol	Rauwolfia serpentina Benth.	
	Shifa	Filfil Siyah	Piper nigrum Linn.	

(Alam, 1991; Rahman, 1999; Ansari, 2002; Aftab, 2005; Ahmad, 2007; Arif, 2008)

Table 2:	Effect of Drug	Combinations o	n Systolic Bloo	d Pressure

S. No.	Name of drug combination	Before treatment (mmHg)	After treatment (mmHg)	Improvement (mmHg)
1.	Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil	186.4	159.4	27
2.	Itrifal Kishneezi	173.1	148.65	24.45
3.	Safoof-e-Kahu-Khar Khasak	165.2	134.6	30.6
4.	Safoof-e-Musakkin	162.7±13.7	140±14.7	22.7
5.	Khameera Sandal Sada	161.8	147.4	14.4
6.	Qurs Dawaus Shifa	151.5±9.5	123.8±6.0	27.7

(Alam, 1991; Rahman, 1999; Ansari, 2002; Aftab, 2005; Ahmad, 2007; Arif, 2008)



SI. No.	Name of the drug	Before treatment (mmHg)	After treatment (mmHg)	Improvement (mmHg)
1	Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil	103.1	92.0	11.1
2	Itrifal Kishneezi	106.75	91.82	14.93
3	Safoof-e-Kahu-Khar Khasak	101.3	85.6	15.7
4	Safoof-e-Musakkin	102.7±8.8	86.4±10.8	16.3
5	Khameera Sandal Sada	100.9	91.7	9.2
6	Qurs Dawaus Shifa	93.32±2.5	82.6±3.1	10.72

Table 3: Effect of Drug Combinations on Diastolic Blood Pressure

(Alam, 1991; Rahman, 1999; Ansari, 2002; Aftab, 2005; Ahmad, 2007; Arif, 2008)

Table 4 : Effect of Drug Combinations on Symptoms

Symptoms	Safoof-e- Khashkhash & Sharbt-e- Bazoori Motadil	litrifal Kishneezi	Safoof- e-Kahu- Khar Khasak	Safoof-e- Musakkin	Khameera Sandal Sada	Qurs Dawaus Shifa
	(% of improved c	ases)				
Headache	52	-	80	91.7	79.2	82
Palpitation	40.75	86.95	81.81	96.0	77.3	88
Fatigability	50	88.88	75	94.0	47.3	79
Dizziness	50	37.5	75	92	61.9	88
Exertional dyspnoea	12.5	57.89	75	84	33.3	82
Sleeplessness	93.3	91.89	80	95.7	76.5	84
Mental stress	-	81.1	-	95.8	-	78

(Alam, 1991; Rahman, 1999; Ansari, 2002; Aftab, 2005; Ahmad, 2007; Arif, 2008)

Conclusion

To manage Zight-ud-Dam Qawi Ibtidai (Primary Hypertension), several Unani Mufrid and Murakkab medicines are described in Classical Unani Literature and many studies have been done in different institutions to validate their efficacy on scientific parameters. On comparing some of these studies, it is being concluded that:

To manage systolic blood pressure Safoof-e-Kahu-Khar Khasak is the best combination, followed by Qurs Dawaus Shifa then Safoof-e-Khashkhash & Sharbt-e-Bazoori Motadil followed by Itrifal Kishneezi, Safoof-e-Musakkin and Khameera Sandal Sada in order.
To manage diastolic blood pressure Safooe-e-Musakkin is the best combination, followed by Safoof-e-Kahu-Khar Khasak then Itrifal Kishneezi followed by Safoof-e-Khashkhash, Qurs Dawaus shifa and Khameera Sandal in order.

To manage the symptomatology of zight-ud-dam qawi Safoof-e-Musakkin is the best combination, followed by Qurs Dawaus Shifa, then Itrifal Kishneezi followed by Safoof-e-Kahu-Khar Khasak, Khameera Sandal Sada and Safoofe-Khashkhash & Sharbat-e-Bazoori Motadil in order

Among the six combinations i.e. Itrifal Kishneezi, Khameera Sandal Sada, Safoof-e-Kahu-Khar Khasak, Safoof-e-Musakkin, Qurs Dawaus Shifa and Safoof-e-Khashkhash & Sharbat-e-Bazoori Motadil, the best three was found to be Safoof-e-Musakkin, Safoof-e-Kahu-Khar Khasak and Qurs Dawaus Shifa in same order in the management of Zight-ud-dam qawi ibtidai (Primary hypertensioin).

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Assessment of Haemoglobin Percentage, RBC count and Serum Iron in Persons of *Damvi* and *Balghami* Temperaments

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Abstract

emperament of a person is determined by the dominance of a particular Khilt (humour). So, it was hypothesized that variation must exist in humours of persons with different temperament. Blood was considered the most suitable Khilt for assessment. The present study was carried out in the Postgraduate Department of Kulliyat, AKTC, AMU Aligarh, from 2008-2010. For this purpose Damvi and Balghami volunteers were selected randomly between the age group of 18-34 years. The study was conducted on 140 healthy volunteers of either sex. The aim of the study was to compare Hb%, RBC count, serum iron in Damvi (sanguine) as well as Balghami (phlegmatic) temperament, and also analyze any variation in the blood constituents of Damvi and Balghami temperament individuals. The temperament of volunteers were determined on the basis of questionnaire prepared in the light of criteria described in classical Unani literature (Ajnas-e-Ashra).Cyanmethemoglobin, Neubauer's chamber and Ferrozine methods were used for assessment of the blood constituents. In our study it was observed that the blood constituents (Hb% t=8.5 p<.001, RBC t=6.4 p<.001, serum iron t=6.1 p<.001) were significantly higher in Damvi as compared to Balghami individuals. Thus, it may be concluded that a relation does exist between various hematological parameters and Mizaj of an individual. It was also established that variation does exist in the Akhlat of different temperament and there was predominance of Khilt Dam in the persons with Damvi temperament. Thus, it may be said that predominance of a particular *Khilt* necessarily exerts its influence in formation of a specific and unique temperament.

Keywords: *Mizaj*, Humours (*Akhlat*), Blood constituents (Hb%, RBC, Serum Iron).

Introduction

The humoural and temperamental theories are the basic and fundamental concepts of Unani medicine. Every person is supposed to have a unique humoural constitution that creates an equilibrium status which represents the *Mizaj* (Temperament) of the body. It includes his physical characteristic and physiological, psychological as well as emotional state. Thus, as no two individuals are same or alike in their temperament. So each individual due to his/her specific temperament is said to possess certain innate strength and deficiencies. (Ahmad,1980; Azmi, 1995; Ibne-e-Sina, 1993). *Damvi* and *Balghami* individuals were selected for this study because these two categories

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show different types of signs and symptoms as their physiological, physical, and psychological features are opposite to each other on the basis of their hot and cold temperament respectively. Basically these two main physical factors (hotness and coldness) play vital role in the determination of Temperament.

This study was started with following aims and objectives.

- 1) To analyze correlation between temperament and blood (*Khilt-e-Dam*) composition.
- 2) To evaluate the impact of predominance of particular humour (*Khilt*) on the blood constituents like Hb%, RBC count and Serum Iron in *Damvi* and *Balghami* temperament individuals.
- 3) To assess the blood constituent (i.e. Hb%, RBC count, Serum Iron) levels in *Damvi* and *Balghami* temperament and to find out whether there is any difference in the normal range of these blood constituents and the type of temperament of individuals are more prone for anaemia.
- 4) To establish the haematological parameters for the determination of temperament by the investigation of blood.
- 5) To analyze the data on statistical parameters to prove the observations and results.

Methodology

The present study was carried out in the Department of Kulliyat, A.K. Tibbiya College, AMU, Aligarh, during the period extending from 2008-2010. One Hundred sixty six (166) volunteers of either sex in age group of 18-34 years were randomly selected for the study, out of which 26 volunteers could not fulfill the inclusion criteria and hence were left out of study and 140 volunteers were finally included in the study. An assessment of temperament (*Mizaj*) of the volunteers was made on the basis of a self designed Proforma (questionnaire) prepared in the light of criteria described in classical Unani literature i.e. ten determinants (*Ajnas-e-Ashra*)(Shah, 2007;Wamiq, 2003). The Proforma for temperament is given in tabulated form. Only *Damvi* (Sanguine) and *Balghami* (Phlegmatic) temperament volunteers of either sex were included in this study. Volunteers having any disease or any history of medication addiction smoking and alcoholism were excluded from the study. Volunteers having any blood disorder and pregnant women were not included in this study.

Categorization of Individual.

The selected volunteers were divided into two groups according to their temperament.

- Group Damvi (Sanguine): Comprised of volunteers having Damvi temperament.
- Group Balghami (Phelgmatic): Comprised of volunteers having Balghami temperament.

After determination of damvi and balghami temperament, the volunteers were randomly called for venipunture.

Blood Sample Collection

2.5 ml blood was drawn from venipuncture by a sterile 5 ml syringe. After that 0.5 ml blood was kept in EDTA vacuum vial and 2 ml blood was collected in plain vial and allowed to clot at room temperature and then centrifuged within an hour of venipuncture. Approximately 1ml serum was obtained from 2 ml of blood.

The following haematological parameters of blood (khilt-e-Dam) were assessed by using the modern laboratory tests. (Mukharjee, 1989; Sood, 2006; Wamiq, 1989).

- (1) Haemoglobin percentage—Cyanmethaemoglobin method
- (2) Red blood cell count—Neubauer's chamber method
- (3) Serum iron—Ferrozine method

Estimation of Haemoglobin

Various methods are available for hemoglobin estimation but for this study, Cyanmethaemoglobin method was selected because of its more advantages as compared to Sahli's method and other methods.

Normal Reference Values (Harsh Mohan, 2000; Sood, 2006; Robbins et al., 2005).

Male — 13-18 g/dl

Female - 12-15g/dl

Estimation of Red Blood Cell Count

The red blood cell count was done to find out the total number of red cells present per cu.mm of blood. In certain physiological conditions there is change in normal count as in age, sex environmental conditions and pregnancy.

Normal Reference Values (Harsh Mohan, 2000; Sood, 2006; Robbins et al., 2005).

Male – 4.5-5.5 million/cu.mm of blood

Female - 3.5-5.0 million/cu.mm of blood

Estimation of Serum Iron

Serum iron was estimated by Ferrozine method (Crest Biosystems)

Normal Reference Values (Harsh Mohan, 2000; Sood, 2006; Robbins et al., 2005).

Male - 60-160 µg/dl

Female - 35-145 µg/dl

Observations

Hb%	Damvi		Ba	Ighami	Total
gm/dl	Male	Female	Male	Female	
11–12	0	0	0	19	19
12–13	4	11	12	18	45
13–14	9	10	11	3	33
14–15	18	1	2	0	21
15–16	14	0	0	0	14
16–17	8	0	0	0	8
Total	53	22	25	40	140
Mean ± S.D	14.7 ± 1.1	13.0 ± 0.6	13.1 ± 0.6	12.1 ± .06	
Significance	t = 6.9 p < .001 (male)		t = 5.7 p <	.001 (female)	

 Table 1:
 Showing distribution of volunteers according to hemoglobin percentage

Table 2:	Showing	distribution	of volunteers	according to	RBC count
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RBC	Damvi		Balg	Total	
billion/cu.mm	Male	Female	Male	Female	
3–4	3	7	2	29	41
4–5	18	15	19	11	63
5–6	32	0	4	0	36
TOTAL	53	22	25	40	140
Mean±S.D	5.0±0.6	4.2±0.5	4.6±0.5	3.8±0.4	
Significance	t = 3.1 p<.	t = 3.1 p<.001 (male)		t = 7.3 p<.001 (female)	

Table 3: Showing distribution of volunteers according to Serum Iron

Serum Iron	Damvi		Balg	Total	
(µg/dl)	Male	Female	Male	Female	
91–100	0	2	0	5	7
100–110	0	0	0	7	7
111–120	1	2	2	7	12
121–130	3	11	10	16	40
131–140	12	6	6	5	29
141–150	23	1	5	0	29
151–160	14	0	2	0	16
TOTAL	53	22	25	40	140
Mean±S.D	144.2± 9.3	125.5±11.7	133.5±10.9	117.7±12.3	
Significance	t = 4.4 p<.	001 (male)	t = 4.7 p<.0	01 (female)	

	Damvi	Balghami	Significance
No. of volunteers	75	65	
Hb.% (gm/dl)	14.2±1.4	12.5±0.9	t = 8.5 p<.001
RBC(million/cu.mm)	4.8±0.7	4.1±0.6	t = 6.4 p<.001
Serum Iron(µg/dl)	130±11.0	118.9±10.7	t = 6.1 p<.001

 Table 4:
 Showing blood constituents of volunteers expressed as Mean ±S.D.



Results and Discussion

Keeping in mind the importance of humours in the creation of specific and unique temperament of an individual and a variation among the characteristics of the Sanguine and Phlegmatic individuals, it was hypothesized that the analysis of blood homour (*khilt-e-dam*) can reveal some important information and results, which may be helpful in the determination of *Damvi* and *Balghami* temperament. Being opposite to each other in temperament and features, the individuals of sanguineous and phlegmatic features can be better evaluated in context of their blood chemistry. Hence, in this study, it was tried to understand the impact of predominance of a particular *khilt* on the blood constituents. Therefore, evaluation of blood constituents (Hb%, RBC count, Serum Iron) in relation with temperament was done and it was analyzed that in which temperament the levels of these laboratory parameters were increased and the relationship between temperament and blood humour (*khilt-e-Dam*) was also assessed.

The results were recorded, interpreted and analyzed statistically by student's 't' test. The results are discussed below.

In our study of 140 volunteers, 75(53.6%) were *Damvi* and 65(46.4%) were *Balghami*. It was also observed that the number of male volunteers having

Damvi and *Balghami* temperament were 53 (37.86%) and 25 (17.86%) where as female were 22 (15.71%) and 40 (28.57%) respectively.

The haematological parameters like Hb%, RBC, and Serum Iron of Blood humour (Red portion of *akhlat*) were evaluated for the assessment of their normal range in *Damvi* and *Balghami*. In this regard our analysis showed that mean and standard deviation of these blood constituents i.e. Hb%, RBC, and Serum Iron were higher in *Damvi* than the *Balghami* volunteers and the difference was statistically significant (Table 4).

Now it may be concluded that *Damvi* and *Balghami* individuals are different from each other in their physiological, physical and psychological features because of significant difference in their blood constituents (i.e. Hb%, RBC count. Serum iron).In modern medicine, it is assumed that these humoral constituents give red colour to the humours (Akhlat) of the body and we evaluated this modern concept of blood in relation with temperament. In Unani medicine, it was considered that dominance of Khilt-e-Dam (Galba-e-Dam) produced Damvi (Sanguineous) temperament and shows its unique features such as reddish/pinkish complexion, warmer on touch, their routine activities are fast, hair growth is rapid and appetite and thirst is increased while Balghami individuals have pale/whitish complexion, colder on touch which indicate low blood constituents (Khilt-e-Dam) but more phlegm(Galba*e-Balqham*) due to which their routine activities and movements are sluggish. and they are dull, have less appetite and thirst and hair growth is slow.(Aziz, 1973;Majoosi,1889;Masihi,1963).All these features indicate that there may be less blood humour as compared to Damvi individuals. So our study is in total conformity to this Unani concept of Damvi individuals having Galba-e-Dam or more blood constituents as compared to Balghami individuals.

Conclusion

In our study, it is clearly evident that temperament of an individual is influenced by his blood composition and its constituents. Thus, every individual has a unique temperament, which includes his physical characteristics, physiological profile and psychological as well as emotional state, which attribute to the *Mizaj.* Therefore, the blood composition and its constituents play an important role in creation of temperament of an individual. During this study it was observed that blood constituents like Hb%, RBC count, Serum Iron were significantly higher in *Damvi* as compared to *Balghami* individuals Thus, it may be concluded that a relation does exist between various haematological parameters and *Mizaj* of an individual. It was also established that variation

does exist in the *Akhlat* of different temperament and there was predominance of *Khilt-e- Dam* in the persons with *Damvi* temperament. Thus, it may be said that predominance of a particular *Khilt* necessarily exerts its influence in formation of specific temperament and this hypothesis has been found correct up to mark.

Our study is a preliminary study and just an effort to set a milestone for further research. If the study is performed with multidisciplinary approach with the help of Genetics, Haematological and physicist, only then, it could be validated and may be acceptable before medical fraternity. Today it is the period of evidence based medicine so that we must have to project the data in favour of this temperament and hematological relations to prove the things more confidently. Moreover, if the study is relevant it must be incorporated in our curriculum.

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Contraceptive Effect of Tukhme Sun (Seeds of *Crotalaria juncea*) in Experimental Animals

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Abstract

ukhme Sun (Seeds of Crotalaria juncea) is one of the many plant drugs described in Unani literature to be useful in family planning. The powder of *Tukhme Sun* was studied for anti ovulatory effect in albino rats and rabbits and for anti implantation effect in albino rats. In the test for anti ovulatory effect in rats, all the animals were treated with 700 mg/kg of the test drug for 10 days and the vaginal smear was examined daily for estrus/diestrus phase. Absence of diestrus phase was taken as the sign of contraception. In another test the rabbits were treated with the test drug (400 mg/kg) for three days and thereafter they were administered Cupric acetate to induce ovulation. After 48 hours the animals were laparotomized and the bleeding points in the uterus were observed. Test for anti implantation activity was carried out in pregnant rats after 10 days of treatment. The two horns of the uterus were observed for implantation sites after laparotomizing the animals. Tukhme Sun exhibited inhibition of ovulation in 80% and 77% of rats and rabbits, respectively. It also induced anti implantation effect in 40% of the animals. The study demonstrated that Crotalaria juncea possesses substantial anti ovulatory and moderate anti implantation activity.

Key Words: Contraception, Anti ovulatory, Anti implantation, Antifertility, *Crotalaria juncea*

Introduction

The current rate of population increase is 1.2% per year and therefore an addition of 80 million people every year, to the existing world population of 7 billion is inevitable. This growth in human population is taxing the natural resources and directly or indirectly affecting the quality of life world over. Control of fertility through contraception is thought to be the most important mean to arrest the growth rate. However, United Nation Fund for Population has estimated that some 200 million women worldwide, especially in the poorest countries, still have an unmet need for effective contraception. Meeting their needs would cost about US\$3.9 billion a year, and could prevent 23 million unplanned births, 22 million induced abortions, 142,000 pregnancy-related deaths (including 53,000 from unsafe abortions) and 1.4 million infant deaths (www.unfpa.org/rh/planning.htm). In this backdrop the development of safe and cheap birth control methods assume special significance and therefore continues to be the high priority area of research in both modern as well as traditional medicines. Studies on contraceptives of plant origin drugs are considered

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important because the synthetic hormonal contraceptives in current use produce some side effects. Interestingly plants possessing diverse types of constituents such as terpenoids, alkaloids, glycosides, phenols, and other compounds have been reported to possess contraceptive and abortive properties. Therefore a number of plant species have been described to possess anti fertility and contraceptive effect. In Unani medicine various methods such as coitus interruptus and vaginal douches along with a number of oral contraceptives have been suggested as means of preventing conception (Adil, 1969; Himes, 1963). However, very few drugs have been investigated for the described effect. Tukhme Sun (Seeds of Crotalaria juncea family Leguminoceae) has been described to be an important anti fertility drug of Unani medicine possessing emmenagogue, anti ovulatory, anti implantation and abortifacient activity (Dymock, 1890; Ghani, 1921; Qureshi, 1957). Further, it has been reported to possess both anti spermatogenic effect in men (Vijaykumar et al., 2004) and anti fertility activity in female (Prakash, 1985). Although various extracts of Cratolaria juncea seeds (Fig 1 and 2) have been subjected to scientific study for anti fertilty activity with the report of anti implantation and anti oestrogenic activity in ethanolic extract (Prakash et al., 1993) but the powder of whole seeds which is the preferred dosage form in Unani medicine has not been investigated. Secondly the anti ovulatory effect of whole drug or its extract has not been studied, and the anti implantation effect due to oestrogenic effect is not very valuable from the clinical point of view (Prakash et al., 1993). In view of the above therefore the powder of Tukhme Sun was studied for anti ovulatory and anti implantation activity in female animal models.





Fig. 1. Pods and Flowers of *Crotalaria juncea*

Fig. 2. Seeds of Crotalaria juncea

Material and methods

Test drug

Tukhme Sun (Seeds of Crotalaria juncea Linn) was procured from Govt.



Agricultural Farm Kuwarsi, Aligarh. The seeds were further authenticated by Prof. S.H. Afaq at the Department of Ilmul Advia, A.M.U., Aligarh. They were dried in air and then ground in an electric grinder so as to prepare the powder of 100 number. A voucher specimen of the seed has been deposited in the museum of department of Ilmul Advia.

The dose of the test drug was calculated by multiplying the human therapeutic dose by conversion factor of 7 for albino rats and by 4 for rabbits (Friedrich et al., 1966) and it was found to be 700 mg/kg and 400 mg/kg, respectively. A fresh suspension of the powdered drug was prepared in normal saline before administration to the animals every day.

Study for antiovulatory activity in albino rats

Method of Kamboj (1982) was adopted to study the anti ovulatory effect of *Tukhme sun* in albino rats.

Regularly cyclic adult female rats weighing 100-150 g were divided in to 2 groups of 6 animals each in such a way that the total weight of animals in both the groups was approximately the same. The animals in group I served as plain control and were given the normal saline while the animals in Group II were treated with the powder of *Tukhme Sun* in the dose of 700 mg/kg orally once a day for 10 days. The vaginal smear of the animals was examined daily for estrus /diestrous phase. The animals persistently showing diestrus phase were recorded as positive and the percentage of such animals in each group was calculated.

Study for anti ovulatory activity in rabbits

The test drug was studied for anti ovulatory activity in rabbits by the method of Chaudhury et al (1970).

Adult female rabbits weighing 1.3 - 1.5 kg were kept in isolation for 21 days to ensure that they were not pregnant and to prevent the induction of ovulation by mating. After isolation the animals were divided in to 3 groups of 3 animals each, such that the total weight of the animals in various groups was approximately the same.

The animals in Group I served as plain control and were administered normal saline. The animals in group II served as standard control and were treated with Norethisterone (German Remedies) in the dose of 0.25 mg /kg once a day for 3 days by oral route with an intragastric soft rubber catheter. The animals



in Group III were treated with the powder of *Tukhme Sun* in the dose of 400 mg/kg orally once a day for 3 days. Thirty minutes after the administration of the last dose a freshly prepared solution of Cupric acetate (0.4%) was administered to each animal intravenously through the marginal ear vein at the dose of 4 mg/Kg to induce ovulation. To check the ovulation, laprotomy of the animals was carried out 48 hours after the Cupric Acetate administration under light ether anaesthesia and the number of bleeding points on each ovary was noted as the indicator of ovulation. The percentage reduction of ovulation in the animals of standard and test groups was determined.

Study for anti implantation activity

The test drug was studied for anti implantation activity in albino rats by the method of Khanna and Chaudhury (1968).

Adult female albino rats of known fertility weighing 125-150 g were used for the study. The vaginal smear of the animals was studied for selecting the proestrus phase. The selected animals were allowed to mate with male rats of proven fertility. Next morning the vaginal smear was examined for the evidence of copulation as shown by the presence of thick clumps of spermatozoa. This day was designated as 1st day of pregnancy.

The pregnant animals were divided in to 2 groups of 5 animals each. The animals in Group I served as plain control and received the normal saline, while the animals in Group II were treated with the powder of *Tukhme Sun* orally at a dose of 700 mg/kg once a day for 11 days.

The rats were laparotomized on the 12th day of pregnancy under light ether anaesthesia and the two horns of uterus were examined for implantation sites. The percentage of the animals showing no implantation sites was determined and the significance level was determined by Sudent's 't' test.

	Table 1:	Effect of Tukhme	Sun on	ovulation in rate
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Group	No. of Rats used	Rats persistently showing diestrus phase	Rats showing regular cycle	% inhibition of ovulation
Control	10	0	10	0%
Tukhme Sun (700 mg/kg)	10	08	02	80%



Group	No. of Rabbits used	Rabbits showing ovulation point	Rabbits showing no ovulation point	% inhibition of ovulation
Control	3	3	0	0%
Tukhme Sun (400 mg/kg)	3	1	2	77%
Norethisterone (0.25 mg/kg)	3	0	3	100%

Table 2: Effect of Tukhme Sun on ovulation in rabbits

Table 3: Effect of Tukhme Sun on implantation in rats

	No. of	No. of rats	No. of rats	No. of rats	No.	Mean	Percentages of
	used	implantation	implantation	implantation	or rats	+SE of	implantation
		sites on 12	sites 12 th	sites in	died	sites	sites on 12 th
		days	day	individual			day
				rats			
Control	5	5	0	5, 6, 4, 6, 6	0	5.4 + 0.357	0
Tukhme	5	3	2	2, 0, 1, 0, 2	0	1 + 0.40*	40
Sun (700							
mg/kg)							

P < 0.02

Observation and Results

Anti ovulatory effect in rat

The daily examination of vaginal smear revealed complete absence of diestrus phase in the animals of control group, while 80% animals of test group showed persistently diestrus phase indicating inhibition of ovulation (Table 1).

Anti ovulatory effect in rabbits

Forty eight hours after intravenous administration of Cupric acetate all the animals were laparotomized (surgical incision was given in to the abdominal wall) to explore the ovaries and to examine the bleeding points on them. Presence of bleeding points indicates the ovulation. All the animals in control group showed bleeding points in the ovaries (100% ovulation), while those in standard group did not show such points (100% inhibition of ovulation). However in the test group 77% animals were found to exhibit inhibition of ovulation (Table 2).



Anti implantation activity in rats

All the animals in the control were found to possess implantation sites indicating that 100% animals conceived and retained the pregnancy whereas 40% animals of test group demonstrated absence of implantation sites on the two horns of the uterus (Table 3).

Discussion

Powder of Tukhme Sun produced about 80% and 77% anti ovulatory effect in rat and rabbit models, respectively. Further, in the test for anti implantation activity 40% of animals did not show any implantation site suggesting a moderate anti implantation effect possessed by the test drug. Anti ovulatory effect was found to be fairly better as compared to anti implantation activity. The findings assume significance because the anti ovulatory effect is considered more important than anti implantation activity in respect of contraception (Garg et al., 1971). The study for anti ovulatory effect was conducted in two different experimental models and both the studies demonstrated almost similar degree of effect despite the difference of animal species. Thus the complementary findings of the two tests confirmed that the test drug possesses significant anti ovulatory effect. It was also found to produce moderate degree of anti implantation activity as 40% animals showed absence of implantation sites on the two horns of the uterus. However further studies in this regard are required to decide the possibility of anti zygotic and abortifacient activity (Bhodanker et al., 1974). All three tests demonstrated that the test drug possesses striking anti ovulatory and moderate anti implantation activity therefore this plant drug can be categorized as one of the important sources of anti fertility or contraceptive agent. The findings are inconsonance with the earlier reports demonstrating that the ethanolic extract of Crotalaria juncea produced anti implantation activity (Anonymous, 1994; Prakash et al., 1993). In another study, chromatographic fraction of ethanolic extract of Crotalaria juncea have been shown to possess significant anti ovulatory activity. Oral administration of the fraction caused an increase in estrus and metaestrus phases and decreased the diestrus phase (Vijaykumar, 2007). Although this report is in conformity with our findings but the ability of chemicals and the isolated compounds to produce toxicity raise the doubts about their therapeutic utility. The plant drugs are subjected to research and development mainly to provide a safe and effective substitute to the available chemicals. Use of isolated component from the plant drugs is simply an upending and will not serve the purpose of providing safe substitution to toxic chemicals. Tukhme Sun and other such contraceptives from natural sources if used as a whole would be especially useful in those cases where hormonal contraceptive agents are contraindicated. A number of active constituents have been isolated from plant drugs such as Lithospermic acid, m-Xylohydroquinone, Coronaridine, Rutin, and Rottlerin have been shown to actually possess the contraceptive effect but often with toxic effect (Farnsworth et al., 1975). There are many plant drugs on the other hand, without a distinct chemical that have the anti fertility effect probably because of the natural configuration of their simple constituents. *Tukhme Sun* has been reported to possess mainly proteins, fibers, oil, fatty acids etc (Anonymous, 1994; Jain & Iqbal, 1989) still it has shown contraceptive effect; it suggests that plant drugs may act in its entirety without the ascendance of any major active constituent. Presence of such a constituent in most of the cases is so meager that it cannot induce major toxicity.

In the present study the whole seed was administered to the animals in powder form which is most acceptable and preferred dosage form of the herbal drugs. The whole drugs with its entire constituents and their natural configuration are supposed to be compatible with the body homeostasis and therefore cause least toxicity. By demonstration of significant anti ovulatory and moderate anti implantation effect the present study substantiate scientifically the Unani usage of the test drug as an anti fertility agent and it also showed the possible mechanism (anti ovulatory) of anti fertility effect therefore indicating the great potential of *Tukhme Sun* as a contraceptive agent. But further studies are warranted in this regard at different dose levels so as to maximize its contraceptive potential.

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www.unfpa.org/rh/planning.htm

Standardization of Sufoofe-mohazzil: An Anti-Obese Unani Formulation

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Abstract

he use of traditional medicines has been very popular in most of the countries of Asia, Africa, Latin America and some other parts of the world from the time immemorial. But for the last few years the developed nations too have been tremendously growing interest in the use of traditional medicines. In India, traditional systems of medicine especially Unani System of Medicine has been practiced to great advantage in the treatment of several diseases for centuries. Today, everyone wants a safe and effective treatment of various ailments including Diabetes, Jaundice, Arthritis, Malaria, Filaria and Obesity etc. These expectations of the people lead to concern over the quality of these medicines. Thus, the quality standardization of the traditional medicines is evidently essential in the present scenario. Therefore, Sufoofe-Mohazzil, a safe and effective anti-obese compound Unani formulation, was taken up for the standardization. To ascertain the quality of this Unani formulation, Physico-chemical parameters, Thin Layer Chromatography, HPTLC, UV Spectroscopy studies were carried out.

Key Words: Standardization, TLC, HPTLC, UV Spectroscopy

Introduction

Today while a large population of the world is suffering from obesity or the diseases occurred due to obesity, the role of anti-obese medicines has become very important in reducing one's weight safely. Sufoof-e-Mohazzil is one of the safe and effective drugs in the treatment of Saman-e-Mufrit (Obesity) (Kabiruddin, 1967). It is a powder drug listed under the sufoof category in National Formulary of Unani Medicines (part- I) (Anonymous, 2006). The present study was carried out on the drug prepared at DSRI, Ghaziabad. According to the formula of the drug (Table-1), Sufoof-e-Mohazzil is made up of six ingredients out of which five ingredients are from plant origin while one ingredient is from animal origin (Anonymous, 2007). A review of the literature indicated that no work was available on identity and Pharmacopoeial Standards of this compound formulation. In order to develop SOPs and Pharmacopoieal Standards, this drug was prepared at laboratory scale to analyze different parameters (Anonymous, 1966). The present paper describes the salient features of microscopical characteristic, physicochemical data, TLC, HPTLC studies, and UV Spectroscopic studies of Sufoof-e- Mohazzil.

Materials and Methods

The ingredients Nankhwah (seed), Tukhm-e-Karafs (seed), Sumbul-ut-Teeb (rhizome), Gul-e-Surkh (flower), Marzanjosh (vegetative parts) and Luk Maghsool (resin) (Fig. – 1) were procured from local raw drug dealer and were identified botanically (Wallis, 1967; Trease & Evans, 1972) using pharmacognostical methods. The Sufoof-e-Mohazzil was prepared at DSRI, Ghaziabad as per the formulation given in National Formulary of Unani Medicine, Part-1 (Anonymous, 2006).

All the ingredients of pharmacopeial quality were taken and made free from all physical impurities and dried under the shade to remove moisture if any.

All the ingredients were crushed separately in an iron mortar to obtain coarse powder. The coarse powder was processed further in a grinder to get its fine form. The ingredients were then thoroughly mixed and sieved through mesh size 60. The powder was stored in a tightly closed plastic container free from moisture and kept in a cool, dry place.

Microscopy

5g of powder was taken and stirred thoroughly in ethanol for some time to remove Luk Maghsool. The supernatant was discarded and the residue was washed with distilled water. A little residue was stained with iodine solution and mounted in 50% glycerin to examine starch grains. Some of the residue was cleared by heating in chloral hydrate solution which was washed with distilled water, stained with safranine and then mounted in 50% glycerin. A little residue was boiled in 2% potassium hydroxide solution, washed with distilled water and mounted in 50% glycerin (Johnson, 1940; Wallis, 1967).

Chemical Analysis

The physico-chemical parameters of Sufoof-e-Mohazzil were analyzed by standard methods as per the WHO guideline (Anonymous, 1998) like removal of foreign matters, water, alcohol and petroleum ether (60-80°) solubilities, total ash, acid insoluble ash and water soluble ash, loss on drying at 105°c, pH values for 1% and 10% aqueous solutions (Anonymous, 1987) and volatile oil estimation (Anonymous, 2000).

Preparation of extract for TLC & HPTLC

5 g of the drug sample was dissolved in 50 ml of pet. ether (60-80°) and refluxed for 30 minutes on a water bath and filtered. The filtrate was

concentrated on water bath and reduced to 5 ml in a standard flask. This extract was used for Thin Layer Chromatography (Wagner, *et al.*,1984; Stahl, 1996).

2 g of the drug was dissolved in 50 ml of pet. ether (60-80°) and refluxed for 15 minutes on water bath and filtered and used as such for HPTLC profile.

Camag HPTLC system was used for the purpose and the photographs were taken by ink jet printer.

Preparation of extract for U.V. Spectroscopic studies

1 g of the drug was dissolved in 100 ml of pet. ether and refluxed for 15 minutes on water bath and filtered. The solution was made up to 100ml in a volumetric flask. This solution was used for U. V. spectroscopic analysis and pure pet. ether was used as a blank solution (Willard *et al.*, 1965).

Observations

The Sufoof-e-Mohazzil is a yellowish brown powder. It has unpleasant smell and slightly bitter taste. The drug did not show any filth, fungus or objectionable matter while the sample was spread in a petridish.

Microscopy shows presence of following plant tissues:

- 1. Papillose epidermal cells in surface view with striated cuticle and short glandular outgrowths; endosperm parenchyma tissue filled with oil droplets and aleurone grains (Nankhwah).
- 2. Epicarp tissue having stomata, striated papillose outgrowths, vittae, sclereids, endosperm parenchyma with aleurone grains and spheroidal crystals of calcium oxalate (Tukhm-e-Karafs).
- Cork cells with parenchyma rich in starch and oil globules; fragments showing fibre, sclereids; vessels with scalariform thickenings (Sumbulut-teeb).
- 4. Parenchymatuos fragments of petals with vascular strands; the surface showing rectangular to radially elongated cells and stomata; simple trichomes and oval pollen grains (Gul-e-Surkh).
- 5. Stem fragments with quadrangular outline; tracheary strands showing spiral thickenings; leaf fragments with stoamata and glandular hairs (Marzanjosh).

The results observed for the physico-chemical data, heavy metals, aflatoxin level, pesticide residue and microbial load have been shown in table 2, 3, 4, 5 & 6 respectively.

Table 1: Formulation Composition

S. No.	Unani Name	Botanical/English Name	Part Used	Quantity
1.	Nankhwah	Trachyspermum ammi (L) Spr.	Seed	10 g
2.	Tukhm-e-Karafs	Apium graveolens L.	Seed	10 g
3.	Sumbul-ut-teeb	Valeriana jatamansi DC.	Rhizome	10 g
4.	Gul-e-Surkh	Rosa damascena Mill.	Flower	25 g
5.	Marzanjosh	Origanum vulgare L.	Vegetative parts	25 g
6.	Luk Maghsool	Cocus lacca	Resin	10 g

 Table 2:
 Physico-Chemical Parameters

S. No.	Parameters	Values
1.	Alcohol soluble matter (%)	20.12 – 21.45
2.	Water soluble matter (%)	14.94 – 16.20
3.	Pet. ether (60-80°) soluble matter (%)	6.22 – 6.78
4.	pH of 1% aqueous solution	5.70 – 5.80
5.	pH of 10% aqueous solution	5.35 – 5.40
6.	Loss of weight on drying at 105° C (%)	8.58 – 9.10
7.	Total Ash (%)	8.10 – 9.32
8.	Water soluble ash (%)	1.50 – 1.92
9.	Acid insoluble ash (%)	2.45 – 2.82
10.	Volatile Oil (%)	0.62 – 0.74



:	Table 3:	TLC Results

S. No.	Name of Drug	Extract	Solvent System	Spraying reagent	No. of Spots	Rf Values with colour
1.	Sufoof-e- Mohazzil	Pet. Ether (60-80o)	Toluene: Ethyl acetate (9:1)	2% Ethanolic Sulphuric acid	05	0.15 (pink) 0.29 (pinkish purple) 0.39 (yellow) 0.62 (pink) 0.74 (pink)
2.	Sumbul-ut- Teeb	-do-	-do-	-do-	08	0.07 (pinkish purple) 0.14 (blue) 0.17 (pink) 0.30 (pink) 0.34 (yellow) 0.39 (florescent green) 0.47 (pinkish purple) 0.50 (blue)
3.	Nankhwah	-do-	-do-	-do-	06	0.22 (brown) 0.30 (brown) 0.34 (yellow) 0.40 (yellow) 0.47 (pink) 0.75 (pink)
4.	Tukhm-e- Karafs	-do-	-do-	-do-	02	0.30 (brown) 0.37 (yellow)
5.	Gul-e-Surkh	-do-	-do-	-do-	07	0.15 (pink) 0.23 (brown) 0.29 (brown) 0.39 (pink) 0.41 (blue) 0.46 (pink) 0.69 (pinkish brown)
6.	Marzanjosh	-do-	-do-	-do-	07	0.16 (pinkish purple) 0.30 (brown) 0.35 (green) 0.41 (blue) 0.47 (pink) 0.53 (green) 0.74 (pink)
7.	Luk Maghsool	Acetone	-do-	-do-	02	0.15 (yellow) 0.67 (light pink)

Table 4: HPTLC Results

S. No.	Name of Drug	Extract	Solvent System	Developing reagent	Rf Values (main) with colour		
					UV254nm	UV 366 nm	After derivatisation
1.	Sufoof-e- Mohazzil	Pet Ether (60-80°)	Toluene: Ethyl acetate (9:1)	2% Ethanolic Sulphuric acid	0.66 Black	0.31 F. Red 0.37 F. Red 0.43 F. Blue 0.51 F. Red 0.72 F. Blue	0.16 Pink 0.31 Brown 0.60 Pink 0.72 Pink
2.	Sumbul-ut- Teeb	-do-	-do-	-do-	0.06 Black 0.31 Black 0.43 Black 0.69 Black	0.31 F. Red 0.35 F. Red 0.43 F. Blue 0.45 F. Blue 0.49 F. Red 0.72 F. Blue 0.77 F. Blue	0.15 Pink 0.31 Brown 0.49 Pink 0.70 Pink
3.	Nankhwah	-do-	-do-	-do-	0.08 Black 0.41 Black 0.46 Black 0.70 Black	0.38 F. Red 0.43 F. Blue 0.46 F. Blue 0.51 F. Red 0.72 F. Blue 0.78 F. Blue	0.15 Pink 0.34 Brown 0.45 Brown 0.49 Pink 0.67 Purple 0.73 Pink
4.	Tukhm-e- Karafs	-do-	-do-	-do-	0.06 Black 0.45 Black 0.51 Black 0.55 Black 0.68 Black	0.37 F. Red 0.41 F. Blue 0.49 F. Red 0.72 F. Blue 0.78 F. Blue	0.15 Pink 0.34 Brown 0.49 Pink 0.70 Pink
5.	Gul-e- Surkh	-do-	-do-	-do-	0.06 Black 0.46 Black 0.68 Black	0.37 F. Red 0.43 F. Blue 0.49 F. Red 0.72 F. Blue 0.78 F. Blue	0.15 Purple 0.34 Brown 0.45 Purple 0.49 Pink 0.70 Pink
6.	Marzanjosh	-do-	-do-	-do-	0.68 Black	0.31 F. Red 0.35 F. Red 0.41 F. Blue 0.45 F. Red 0.48 F. Red	0.15 Pink 0.34 Brown 0.49 Pink 0.70 Pink
7.	Luk Maghsool	Acetone	-do-	-do-	0.08 Black 0.46 Black 0.70 Black	0.11 Yellow 0.35 F. Red 0.37 F. Red 0.45 F. Blue 0.51 F. Red 0.74 F. Blue 0.80 F. Blue	0.16 Pink 0.34 Brown 0.49 Pink 0.70 Pink

Results and Discussion

Chemical Analysis

The physico-chemical data of the drug are shown in Table 2 .The water soluble extractives (14.94-16.20%) indicates the absence of any inorganic constituent. An 8.5-9% loss in weight on drying at 105° C shows that the moisture contents are very low in the drug. The low value of acid insoluble ash of the drug indicates that the drug is free from siliceous matter. The volatile oil is present due to the presence of Nankhwah and Tukhm-e-Karafs in the Sufoof.

Thin Layer Chromatography Analysis

TLC was carried out on pet. ether (60-80°) extracts of the sufoof and its ingredients except Luk Maghsool which was extracted by acetone. TLC was performed on pre-coated plate of Silica Gel 60 F_{254} (E. Merck) using the solvent system of Toluene - Ethyl acetate (9:1). The TLC of Sufoof-e-Mohazzil shows five spots at R_f 0.15(pink), 0.29(pinkish purple), 0.39(yellow), 0.62(pink) and 0.74(pink) on spraying with 2% ethanolic sulphuric acid and heating the plate for about 10 minutes at 105° C in an oven (Table-7, Fig.- 2).

HPTLC profile

HPTLC of pet. ether (60 ° -80°) extract of the drug was performed using TLC plate pre-coated with Silica Gel 60 F_{254} (E. Merck). CAMAG Linomat IV automatic sample spotter was used as an applicator. After developing the plate in the solvent system of Toluene - Ethyl Acetate (9:1), it was scanned through CAMAG TLC scanner. The plate was dipped in 2% elcoholic sulphuric acid and heated at 105° C on CAMAG TLC plate heater till the coloured spots appeared (Table-8; Fig.-3 (a,b,c).

HPTLC finger-printing of Sufoof-e-Mohazzil with its all six ingredients under U.V. 254 nm, 366 nm and after derivatization shows similar pattern as all major bands shown in the chromatogram of the ingredients are also present in the chromatogram of the sufoof (Fig. -3 (a,b,c). This comparative HPTLC spectra of sufoof with its ingredients confirm the absence of any adulterants and also confirm that the sufoof is derived from a defined botanical species and all constituents are clearly characterized (Sethi, 1996).

U.V. Spectroscopic Studies

The study of the U V spectra of the drug Sufoof-e-Mohazzil and its ingredients shows that a single broad region (218.00 nm) appears in the spectrum of

sufoof is the characteristic one and shows the merger of characteristic peaks of its ingredients like peak no. 2 at 209 nm in Nankhwah, peak no.1 at 220 nm in Sumbul-ut-teeb, peak no. 2 at 209 nm in Marzanjosh, peak no.1 at 209 nm in Gul-e-Surkh, peak no. 1 at 210 nm in Tukhm-e-Karafs and peak no. 1 at 209 nm in Luk Maghsool (Fig. 4, 5, 6, 7, 8, 9, 10).



Fig. 1: Ingredients of Sufoof-e-Mohazzil (Nankhwah; Tukhm-e-Karafs; Sumbul-ut-Teeb; Gul-e-Surkh; Marzanjosh; Luk Maghsool)



Fig. 2 : TLC of Sufoof-e-Mohazzil and its ingredients

1. Sufoof-e-Mohazzil; 2. Sumbul-ut-Teeb; 3.Nankhwah; 4.Tukhm-e-Karafs; 5. Gul-e-Surkh; 6.Marzanjosh; 7.Luk Maghsool





Fig. 3: (a) HPTLC of Sufoof-e-Mohazzil and its ingredients under UV 254 nm







Fig. 3 : (c) HPTLC of Sufoof-e-Mohazzil and its ingredients after derivatization

1. Sufoof-e-Mohazzil; 2. Sumbul-ut-Teeb; 3.Nankhwah; 4.Tukhm-e-Karafs; 5. Gul-e-Surkh; 6.Marzanjosh; 7.Luk Maghsool













Fig. 8





Fig. 10

Conclusion

It is very difficult to identify the single drugs once they are powdered and mixed for preparing compound formulations. The present study, therefore, holds high significance as the microscopic features, various physico-chemical standards, the R_f values of TLC and HPTLC and U. V. Spectra provide criteria for easy identification of the drug Sufoof-e-Mohazzil and ensure the quality and efficacy of the medicine.

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Ethnopharmacological Study of Medicinal Plants in East Tarai Forest Division Haldwani, Uttarakhand

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Abstract

his report deals with of the results an ethnopharmacological survey of medicinal plants conducted during November, 2000, in the East Tarai Forest Division Haldwani, Nainital - one of the important divisions of Kumaon's tarai in Uttarakhand. It lists 30 plant species belonging to 24 families that are widely used by the indigenous communities of the area as folk drugs for treatment of various diseases and conditions of humans and cattle. For each plant species the correct botanical and prevalent local names, part used, claimed medicinal use(s) and mode of administration are given. The study has revealed, hitherto, many unknown traditional phytotherapeutic uses of plants from the area investigated.

Keywords: Ethnopharmacological survey, Folk medicine, Haldwani, Nainital, Kumaon.

Introduction

In Nainital district of Kumaon region (Uttarakhand), the tarai belt is well formed along the base of outer hills of Siwalik ranges. This sub-himalayan tract has super abundance of water and rich floral diversity. It is a land of diverse cultures and ethnic groups who mainly use natural products directly as drugs. From different parts of the area a wide range of plants with ethnomedicinal value against a number of important diseases have been reported by many workers (Agnihotri *et al.*, 2003; Anonymous, 2001, 2008; Pant and Pandey, 1998; Singh, 1993, 2003; Singh *et al.*, 1987; Singh and Maheshwari, 1990, 1993, 1994). No separate list, however, exists for the plants which are in therapeutic use among the tribals of East Tarai Forest Division Haldwani, Nainital. Therefore, the present report communicates information on widely used herbal preparations collected during an ethnopharmacological survey conducted in this forest tract.

The area of study forms a part of Nainital and Udham Singh Nagar districts of southernmost Kumaon region and lying between 28° 43' 07" - 29° 09' 28" N latitude and 79° 32' - 80° 06' 45" E longitude. It comprises of nine forest ranges viz. Gola, Kishanpur, Dauli, Ransali, Barakoli, South Joulasal, Surai, Khatima and Kilpura (Fig. 1) which are predominantly inhabited by 'Tharus' and 'Vangujjars'. These people have their own diverse religious culture and social traditions. They practice primitive agriculture and raise cattle. Their elders still possess good knowledge of the healing properties of local flora, acquired in the course of long experience and association with the forests.

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Methodology

Fieldwork was carried out in November 2000. During the course of this field study reliable medicine men and other knowledgeable villagers were interviewed and relevant information was collected along with plant specimens. All the plants were later taxonomically identified by the senior author with the help of related floras (Gupta, 1968; Hooker, 1872-1897; Osmaston, 1972) and nomenclature was updated according to a recent work on flowering plants of Uttarakhand (Uniyal et al., 2007). Voucher herbarium specimens were prepared and deposited in the Herbarium of the Survey of Medicinal Plants Unit, Regional Research Institute of Unani Medicine, Aligarh (U.P.), India.



Fig. 1: Map showing the areas surveyed in the East Tarai Forest Division Haldwani, Naintal

Observations

In the following listing medicinal plants are arranged in alphabetical order by their scientific names. Each entry provides information on correct botanical name, family, prevalent local name, locality, voucher specimen number and folk medicinal use(s) with mode of administration. As far as possible, the probable dosage and duration of these crude drugs are also given.



Achyranthes aspera L. (Amaranthaceae), 'Ulta Shaji', Dauli (*SMPUA6307*). Aerial parts are burnt to ashes and about half teaspoon of this is mixed with honey and given for reliving chronic cough.

Adiantum lunulatum Burm. f. (Adiantaceae), 'Chandni Buti', Kishanpur (*SMPUA6336*). Fresh fronds with leaves of 'kasni' (*Cichorium intybus* L.) in equal quantities are boiled in water and liquid strained. One cup of the resulting decoction is drunk twice daily for irregular menses.

Asparagus racemosus Willd. (Liliaceae), 'Satawar', Surai (*SMPUA6433*). Root powder (10g) is given with milk twice daily for sexual debility.

Calotropis gigantea (L.) R. Br. (Asclepiadaceae), 'Akawa', Joulasal (*SMPUA6329*). Young vegetative buds with betel palm are given to feed on an empty stomach for 10-15 days in jaundice.

Careya arborea Roxb. (Lecythidaceae), 'Kumbha', Surai (*SMPUA6398*). Fresh stem bark is chewed for stomatitis.

Chlorophytum tuberosum (Roxb.) Baker (Liliaceae), 'Safed Musli', Joulasal (*SMPUA6470*). Roots of 'safed musli', 'kali musli' (*Curculigo orchioides* Gaertn.) and 'kamraj' (*Helminthostachys zeylanica* (L.) Hk.) in equal quantities are crushed together; one spoonful of this paste is given at bedtime for sexual weakness.

Cissus repanda Vahl (Vitaceae), 'Ghaiya', Surai (*SMPUA6420*). Root is ground with turmeric and placed on cut and wound for skin growth.

Colebrookea oppositifolia J. E. Smith (Lamiaceae), 'Binda', Ransali (*SMPUA6469*). A freshly made paste of the root, obtained by crushing, is applied on wounds as an antiseptic. Ripe fruits chewed for stomatitis.

Cuscuta reflexa Roxb. (Cuscutaceae), 'Agasbel', Sudlimath (*SMPUA6388*). Plant paste is applied locally for abdominal swelling.

Drimia indica (Roxb.) Jessop. (Liliaceae), 'Banpiaj', Joulasal (*SMPUA6469*). Fresh bulb is crushed and squeezed to obtain the juice. It is used as ear drops for otorrhoea.

Euphorbia fusiformis Buch. - Ham. ex D. Don (Euphorbiaceae), 'Banmuli', Joulasal (*SMPUA6460*). Root is made into small chips and given to induce conception.

Euphorbia hirta L. (Euphorbiaceae), 'Dudhi', Kishanpur (*SMPUA6363*). Plant paste is given orally for diarrhoea and dysentery.

Helicteres isora L. (Sterculiaceae), 'Ainthaphal', Raikhal (*SMPUA6350*). Dried fruits are ground to make a fine powder; about 10 g of this are given twice daily to treat dysentery.

Helminthostachys zeylanica (L.) Hk. (Helminthostachyaceae), 'Kamraj', Khatima (*SMPUA6431*). One spoonful root powder is given with milk two times a day for 21 days in leucorrhoea.

Holarrhena pubescens (Buch. - Ham.) Wall. ex G. Don (Apocynaceae), 'Kura', Surai (*SMPUA*6281). Seed decoction is administered orally against malaria fever.

Launaea procumbens (Roxb.) Ramayya and Rajagopal (Asteraceae), 'Gobhi', Surai (*SMPUA6473*). Plants are added to the feed of cows and buffaloes to increase lactation.

Leonotis nepetifolia (L.) R. Br. (Lamiaceae), 'Ban Tulsa', Nandhaur (*SMPUA6357*). Leaf decoction is drunk for common fever.

Litsea glutinosa (Lour.) Robins. (Lauraceae), 'Meda', Surai (*SMPUA6474*). Stem bark paste is applied locally for sprain.

Miliusa velutina (Dunal) Hook. f. & Thomson (Annonaceae), 'Ellar', Surai (*SMPUA6411*). Fresh leaves with turmeric, mustard and slaked lime are crushed together and the paste is applied on bruises.

Mimosa pudica L. (Mimosaceae), 'Lajwanti', Kishanpur (*SMPUA6335*). About 5g of the seed powder are given two times a day for one month to treat spermatorrhoea. It is also used for treating backaches.

Oroxylum indicum (L.) Vent. (Bignoniaceae), 'Ullu', Banbasa (*SMPUA6502*). Seed paste is administered orally and simultaneously applied on forehead in high fever.

Piper longum L. (Piperaceae), 'Pipal', Kishanpur (*SMPUA6352*). Powder of the fruit is mixed with honey and given for cough and common cold.

Pongamia pinnata (L.) Pierre (Fabaceae), 'Kanji', Kilpura (*SMPUA6478*). A dried pod is tied as an amulet around the neck of healthy child to avoid effect of evil eyes.

Pterocarpus marsupium Roxb. (Fabaceae), 'Bijasal', Joulasal (*SMPUA6462*). The tree yields gum kino which is collected, dried and ground to make a powder. About 10g of this are given with water for abdominal pain.



Rauvolfia serpentina (L.) Benth. ex Kurz. (Apocynaceae), 'Showait Barua', Chhankaiyya (*SMPUA6515*). Root powder is given with water for fever, abdominal pain and snake bite.

Smilax ovalifolia Roxb, (Smilacaceae), 'Rampan', Surai (*SMPUA6424*). Stem twig is used daily as toothbrush to strengthen gums and teeth.

Streblus asper Lour. (Moraceae), 'Sihor', Ransali (*SMPUA6393*). Tender stem is used as toothbrush for dental care.

*Terminalia arjuna (*Roxb. ex DC.) Wight (Combretaceae), 'Arjun', Kilpura (*SMPUA6481*). Paste of the stem bark is applied on burns.

Trichodesma indicum (L.) R. Br. (Boraginaceae), 'Andaoli', Surai (*SMPUA6419*). Cooked aerial parts are given to feed as pot herb in joint pain.

Urtica dioica L. (Urticaceae), 'Kandali', Dauli (*SMPUA6301*). Wilted plants are added to the feed of milk producing animals for increasing lactation.

Discussion

This report documents some traditional and contemporary knowledge of the medicinal plants employed by the inhabitants of the East Tarai Forest Division Haldwani, Nainital. A total of 30 plant species from 24 families were recorded for treating or alleviating various diseases and conditions viz. Bone fracture, bruise, burns, common cold and fever, chronic cough, diabetes, diarrhoea, dysentery, irregular menses, leucorrhoea, joint pain, otorrhoea, sexual debility, sprain, stomach-ache, stomatitis and many complaints of domestic animals. The data are authentic and obtained from reliable traditional healers who have long been using these plants in their health related problems. A comparison with the available literature (Anonymous, 1948-1976, 2001, 2008; Chopra et al., 1956; Jain, 1991; Kirtikar and Basu, 1935; Nadkarni, 1954; Watt, 1889-1892) revealed that uses of many plant species (e.g. Achyranthes aspera, Asparagus racemosus, Chlorophytum tuberosum, Euphorbia hirta, Helicteres isora, Holarrhena pubescens, Litsea glutinosa, Piper longum, Rauvolfia serpentina, Streblus asper have been reported. Furthermore, a few medicinal claims described herein coincide with those of other parts of Kumaon (Ali et al., 2008; Anonymous, 2008; Arya and Prakash, 1999; Arya et al., 1999; Bhatt and Gaur, 1992; Garbyal et al., 2005; Gupta, 1960; Kalakoti and Pangtey, 1988; Shah and Jain, 1988, Shah and Joshi, 1971; Shah, 1982; Upreeti et al., 2009). Uses of other plants seem to be new or imperfectly known and deserve scientific screening.



The aim of present investigations is to report widely used medicinal species with ethnomedicinal information from Nainital's tarai with a view to contribute material to the rich herbal heritage of Kumaon region of Uttarakhand in an attempt to develop and discover novel plant-based pharmaceuticals.

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Quality Evaluation of Ingredients of 'Trifala' Churna (Phyllanthus emblica L., Terminalia bellirica Roxb. and Terminalia chebula Retz.) Resourced from Commercial Sources

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Abstract

ommercial samples of herbal ingredients of a popular classical preparation 'Trifala Churna', *Phyllanthus emblica* L. (Amla), *Terminalia bellirica* Roxb. (Bahera) and *Terminalia chebula* Retz. (Harad) were evaluated to assess their quality in respect of identity, purity and strength. The raw samples of herbal drugs were resourced from Delhi, Hardwar and Cochin markets. Evaluation is based on specific parameters and limits developed by standardising authentic samples of drugs.

Keywords: Pharmacognostic evaluations, Commercial herbal drugs, Quality assessment.

Introduction

Raw drugs used by the industries for the preparation of classical formulations of Ayurvedic, Unani and Shiddha system of medicines are mostly resourced from the wild or cultivation sources. It is estimated that about 800 species are used in production by the pharmaceutical industry, whereas less than 40 species of plants are resourced through commercial cultivation. Over 70% of the plant collection involves destructive harvesting. The raw drugs collected from wild sources remain questionable for their quality especially when they have been procured from trade channels owing to fair chances of adulteration, substitution and inappropriate storage conditions which lead to deterioration in quality (Padmakumar *et al.*, 2012 a,b,c,d; Rai *et al.*, 2011, 2012a,b).

'Trifala' chruna is one the most important classical formulation which is recommended as a mild laxative, which cleanses and tonifies the gastrointestinal tract. The main ingredients of Trifala churna are the dried fruits of *Phyllanthus emblica* L., *Terminalia bellirica* Roxb. and *Terminalia chebula* Retz. in equal proportion. Drugs industries procure the raw drug material from the herbal drug markets. All the raw drugs which are available in dried form in the market are always subject to quality check in a laboratory on the basis of pharmacognostical, physico-chemical, phyto-chemical, microbiological and other analytical specifications. Present communication deals with the pharmacognostical, physico-chemical and phyto-chemical evolution of the market samples of *Phyllanthus emblica* L., *Terminalia bellirica* Roxb. and *Terminalia chebula* Retz. which are by and large procured from the three major herbal markets, namely, Delhi, Hardwar and Cochin. This communication will be very helpful for the herbal industry for setting their in-house parameters and testing of the raw ingredients of 'Trifala' churna.

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Materials and Methods

The raw drugs under study were collected from natural habitats and authenticated with reference to pharmacopoeial standards and other literature. The commercial samples sold under the trade names purported to be prescribed species were drawn from the different market sources (Hardwar, Delhi and Cochin/Trichur). Standard protocols/methods prescribed in pharmacopoeia were followed for pharmacognostical, physico-chemical and phytochemical values. The specification laid down in Ayurvedic, Unani and Siddha Pharmacopoeia of India were considered to evaluated the quality of the commercial samples (Anonymous, 1986, 1998, 1999, 2007a,b and 2008).

Table 1: Commercial Herbal Drugs under Study

Botanical Name	Official Name	Trade Name	Morphological Part
Phyllanthus emblica L.	Amlaki	Amla	Fruit
Terminalia bellirica Roxb.	Bibhitaka	Bahera	Fruit
Terminalia chebula Retz.	Haritaki	Harad	Fruit

Observations and Results

All the commercial samples of the drugs were evaluated as per the specifications laid in Pharmacopoeia and other literature. Observations made are given in Table 2 to 4.

Table 2.	Pharmacognostical Evaluation of Co	ommercial Crude	Drug Samples
	of Phyllanthus emblica L.		
	1		

SI. No.	Specifications	Market Sample		
		Delhi	Hardwar	Cochin
А.	A. Entire Drug 1. Macromorphological characteristics		Conforms	Conforms
	2. Micromorphological characteristics	Conforms	Conforms	Conforms
В.	Powdered drug	Conforms	Conforms	Conforms
C.	Major organic groups (i) Alkaloids (ii) Tannins (iii) Glycosides (iv) Sterols (v) Volatile oil (vi) Flavonoids (vii) Anthraquinone (viii)Resins (ix) Fixed oil (x) Poly phenolic compounds	- - - - - - - - - - - -	- - - - - - - - -	- - - - - - - - - - - - -

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D.	Physico-Chemical characteristics			
	(i) Moisture Content %	22.56	32.78	0.56
(ii) Total ash %		5.20	6.60	7.65
(iii) Acid insoluble ash %		1.80	1.32	0.80
	(iv) Water soluble extractives	59.00	52.50	49.34
	(v) Alcohol soluble extractives %	43.50	45.00	38.00
E.	Foreign matter %	3.20	3.90	2.24

Table 3. Pharmacognostical Evaluation of Commercial Crude Drug Samples of*Terminalia bellirica* Roxb.

SI. No.	Specifications	Market Sample		
		Delhi	Hardwar	Cochin
A.	Entire Drug 1. Macromorphological characteristics	Conforms	Conforms	Not conforming
	2. Micromorphological characteristics	Slightly varies	Conforms	Slightly varies
B.	Powdered drug	Conforms	Conforms	Conforms
C.	Major organic groups (i) Alkaloids (ii) Tannins (iii) Glycosides (iv) Sterols (v) Volatile Oil (vi) Flavonoids (vii) Anthraquinone (viii)Resins (ix) Fixed oil (x) Poly phenolic compounds	- - - - - - - - - - -	- - - - - - - - -	- - - - - - -
D.	Physico-chemical characteristics (i) Moisture content % (ii) Total ash % (iii) Acid insoluble ash % (iv) Water soluble extractives (v) Alcohol soluble extractives %	5.60 3.50 0.95 37.00 8.50	3.80 2.95 0.50 40.10 9.20	2.56 4.10 0.75 38.20 8.80
E.	Foreign matter %	0.85	0.98	1.25

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SI. No.	Specifications	Market Sample			
		Delhi	Hardwar	Cochin	
A.	Entire Drug 1. Macromorphological characteristics	Conforms	Conforms	Conforms	
	2. Micromorphological characteristics	Conforms	Conforms	Conforms	
B.	Powdered drug	Conforms	Conforms	Conforms	
C.	Major organic groups (i) Alkaloids (ii) Tannins (iii) Glycosides (iv) Sterols (v) Volatile Oil (vi) Flavonoids (vii) Anthraquinone (viii)Resins (ix) Fixed oil (x) Poly phenolic compounds	- - - - - -	- - - - - - - - - -	- - - - - - - -	
D.	Physico-Chemical Characteristics (i) Moisture Content % (ii) Total ash % (iii) Acid insoluble ash % (iv) Water soluble extractives (v) Alcohol soluble extractives %	5.60 3.50 0.15 64.15 44.95	2.80 3.20 1.60 52.00 42.55	3.50 4.15 2.10 58.20 40.55	
E.	Foreign Matter %	2.20	Nil	1.25	

Table 4. Pharmacognostical Evaluation of Commercial Crude Drug Samples of *Terminalia chebula* Retz.

Discussion and Conclusion

Pharmaco-botanical evaluation of three ingredients of Trifala churna viz. *Phyllanthus emblica* L., *Terminalia bellirica* Roxb. and *Terminalia chebula* Retz. were procured from three different market sources and compared with the genuine and authenticated crude drug samples as well with pharmacopoeial standards. Each plant drug is discussed in detail as below:

Fresh and dried fruits of *Phyllanthus emblica* L. (Fig. 1) are used as drug in various preparations of Ayurveda and Unani system; dried mature fruits are available in the market, either as whole ones or as curled pieces; micro

morphologically, it shows ramified vascular elements, stone cells either isolated or in small groups and pitted vascular fibres; powder shows isodiametric parenchyma cells with irregular thickened walls, occasionally short fibres and trachieds; major chemical constituents are Ascorbic Acid and Tannin. All the collected commercial samples conform to the authentic sample. Moisture content varies from 0.56% to 32.78%. Terminalia bellirica Roxb. (Fig. 2) is available as dried fruit with the name of Baheda which is nearly spherical to ovoid in shape and grey to greyish brown in colour with slightly wrinkled appearance; most of the mesocarp cells contains simple starch grains and some stone cells; rosette crystals of calcium oxalate and stone cells present in the parenchymatous cells; active chemical constituents are tannins; micro morphological characteristics of Delhi and Cochin sample slightly varies; physico-chemical characteristics and macro morphological characteristics of all the samples conform to that of the genuine authenticated sample. Haridwar sample perfectly conforms to the authenticated sample. Foreign matter content varies from 0.85% to 1.25%. Terminalia chebula Retz. (Fig. 3) is available as dried fruit in the market with the name of Harad, yellowish brown in colour, wrinkled and ribbed longitudinally; tannins and raphides are present in parenchyma; endocarp consists of thick walled sclerides of various shapes and sizes; starch grains simple rounded or oval in shape; powder brownish in colour with occasional crystals of calcium oxalate are also seen; active chemical constituents are Tannins, Polyphenolic compounds etc. All the collected samples perfectly conform to that of the authentic sample. Haridwar sample was perfectly devoid of foreign matter.

The present study reveals that commercial samples are always subject to quality control for their authenticity to ensure identity, purity and strength as per pharmacopoeial and other quality standards before their use to formulate the medicine. This quality evaluation practice may also ensure the safety and efficacy of medicine up to larger extent.



Fig. 1: Macro-morphological features of dried fruit of *Phyllanthus emblica* L.



Fig. 2: Macro-morphological features of dried fruit of *Phyllanthus emblica* L.





Fig. 1: Macro-morphological features of dried fruit of *Phyllanthus emblica* L.

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Ethnobotanical Survey of Konark Forests of District Puri, Odisha

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Abstract

ased on an ethnobotanical field investigation of medicinal plants carried out in Konark forest range and adjacent areas of Puri Forest Division, Odisha, during December, 2011 - January, 2012, the paper presents 30 plant species widely used in the area for various purposes including treatment of different diseases and conditions either single or in combination with some other ingredients. The information on botanical name, family, local name, locality, voucher specimen number and folk uses are presented. Nevertheless, need for pharmacological studies and clinical trials on the reported folk medicines which can be used for the benefit of ailing humanity following investigations on their medical efficacy and safety has been re-stressed.

Introduction

Plants have been used in traditional medicine for several thousand years (Abu-Rabia, 2005). The knowledge of medicinal plants has been accumulated in the course of many centuries based on different medicinal systems such as Ayurveda, Unani and Siddha. In India it is reported that traditional healers use 2500 plant species among them around 100 species of plants serve as regular sources of medicine (Pei, 2001). Medicinal plants are the basic health care of rural households form the resource base for rapidly growing pharmaceutical industry and cosmetic. In recent years, there has been a tremendous range of interest in the interest in the medicinal plants especially those used in Ayurveda, Unani and other traditional systems of medicines. The folk medicinal traditions play a reflecting and prominent role in human and environment interaction (Chopra *et al.*, 1956).

An ethnobotanical survey of Konark Forest range under Puri Forest Division, Odisha provided first-hand information on folk medicinal uses of plants for treatment of various diseases and conditions. The Puri district lies between the latitudes 19°28'N to 26°35'N and longitudes 84°29'E to 86°25'E. It has a geographical area of 3051 km2 or 264988 Ha. The area explored included Kanti, Barimuda, Pipili, Harishpur, Padampur, Jatani, Padampur and Konark. The present investigation focuses was performed with the aim of producing an inventory of the plants used by traditional healers in Konark Forest Range and adjacent areas of Puri district of Odisha to treat various ailments.

The whole of the district may be divided into two dissimilar natural divisions. One is the littoral tract: The strip of the country lies between the alluvial and the

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Bay of Bengal. and second is the level alluvial tract: This level of alluvial region is full of villages and rice fields, watered by a network of channels, through which the water of distributaries of the most southerly branch of Mahanadi , find their way to the sea. There is no hill in Puri District except a small cultivate land under plough. Generally biali or autumn rice, sarada or winter rice and dalua or spring rice these three types of rice are cultivated.

Materials and Methods

An ethnobotanical survey of Konark Forest range of Puri forest division of odisha was conducted in December, 2011 to January, 2012 with a view to study the medicinal plants of the area and also record the folk wisdom of tribal known as Kondh, Munda, Khandait, Santal and agriculturist who have since long settled in the villages. The data on medicinal uses of plants were recorded from the well reputed Kaviraj (Medicine men) through their direct interview. Each of the plant material was assigned a field note books and documented as to botanical name with family, local name, locality with voucher specimen number, part used and therapeutic uses. Plant parts that were identified as having use in ethnobotany were collected, compressed, the voucher specimens were collected and identified by referring to standard Flora (Saxena & Brahmam, 1994-1996). All the voucher specimens were maintained in the herbarium at Regional Research Institute of Unani Medicine (RRIUM), Bhadrak, for future reference and study. Ingredients and adjuvant drugs in a particular recipe have been recorded by their local names in field and scientifically identified at the Institute.

Enumeration

The plants used by the inhabitants in the study area are arranged in alphabetic order. Each entry provides the information i.e., botanical name with family local name, locality with voucher specimen number, part used, and ethnopharmacological uses.

Acacia auriculiformis L. (Mimosaceae); Aksia; Jatni-9225; Stem; Stem wood is used in making furniture.

Achyranthes aspera L. (Amaranthaceae); Apamarango; Pipili-9253; Root; Lactation Problems; Root paste is mixed with cow's milk and given to care of lactation.

Andrographis paniculata (Burm.f.) Wall. ex G. Don (Acanthaceae); Bhunimbo; Barimuda-9145; Leaf; Wounds, Skin Diseases; Leaves decoction is used to

washing wounds for healing. Leaves paste mixed with haldi is applied locally to treat pruritis, scabies etc.

Atylosia scarabaeoides (L.) Benth. (Fabaceae); Bankulthia; Jatni-9223; Whole Plant; Plant used as fodder in this area.

Azadirachta indica A. Juss. (Meliaceae); Limbo; Pipili-9163; Leaf; Skin Diseases; Leaves decoction is used by the local inhabitants to treat kanchokundia (Skin diseases). Twigs are used as tooth stick.

Blumea lacera (Burm.f) DC (Asteraceae); Pokosunga; Padampur-9190; Leaf; Toothache; Leaves decoction is used in gargling to treat toothache.

Bridelia retusa (L.) Spreng (Euphorbiaceae); Kassi; Pipili-9162; Fruit, Stem Wood; Ripe fruits are eaten raw by the children. Stem wood used in making furniture.

Cassytha filiformis L. (Lauraceae); Nirmudi; Jatni-9222; Whole Plant; Bone Fracture; Plant paste is heated in castor oil and bandage to treat bone fracture.

Chromolaena odorata (L.) King. & Robins. (Astearaceae); Phuluri; Pipili-9169; Leaf; Cuts; Leaves juice is applied locally on cuts to check bleeding.

Combretum roxburghii Spreng. (Combretaceae); Atundi; Pipili-9160; Leaf; Skin Diseases; Leaves juice is applied locally to treat cracked heal and also used as antifungal (Balikhai-Kundia).

Croton bonplandianus Baill. (Euphorbiaceae); Banmiricho; Kanti-9114; Plant Sap; Cuts & Wounds; Plant sap is used to treat cuts and wounds.

Datura metel L. (Solanaceae); Kala Dudura; Kanti-9104; Leaf; Leaf paste warm in jada oil (*Ricinus communis* L.) and applied on affected part of the body for remove inflammation.

Elephantopus scaber L. (Asteraceae); Mayurchulia; Barimuda-9152; Whole Plant; Plant used as fodder in this area.

Eucalyptus citriodora Hook. (Myrtaceae); Patas; Pipili-9245; Leaf; Blood Dysentery; Leaves juice/paste is used in blood dysentery (Nalijhada).

Eugenia bracteata (Willd.) Roxb. *ex* DC (Myrtaceae); Unchana; Jatni-9221; Fruit; Edible; Ripe fruits are eaten raw.

Euphorbia antiquorum L. (Euphorbiaceae); Siju; Jatni-9200; Latex; Wounds; Latex is applied locally on wounds for healing.

Ficus benghalensis L. (Moraceae); Baro Gachho; Konark-9238; Latex; Heal Cracks; Latex is applied locally on cracks of heal.

Ficus hispida L.f. (Moraceae); Dumaro; Kanti-9106; Fruit, Latex; Boils; Fruits/ latex with salt is applied to treat boils.

Hemidesmus indicus (L.) R. Br. (Periplocaceae); Swanloi; Padampur-9182; Flower; Flowers are used on the occasion of Deepawali.

Hygrophila auriculata (Schum.) Heine (Acanthaceae); Koelekhia; Kanti-9108; Spines; Swelling; Spines paste is applied locally on swollen part for the treatment.

Ipomoea sp. (Convolvulaceae); Gadainoi; Jatni-9224; Stem; Stem used as bonding material for the chhappar etc.

Jatropha gossypifolia L. (Euphorbiaceae); Nali Gaba; Kanti-9113; Leaf; Joint Pain; Leaves are used in joint pain.

Lippia javanica (Burm.f.) Spr. (Verbenaceae); Naguari; Kanti-9112; Leaf; Leaves are used for preservation of grains i.e. rice moong etc.

Mimosa pudica L. (Mimosaceae); Lajkuli; Barimuda-9143; Root; Cold & Fever; Root paste is given in required quantity with honey to treat common cold and fever.

Moringa oleifera Lam. (Moringaceae); Sajana; Barimuda-9122; Leaf, Fruit; Leaves and fruits are cooked and eaten as vegetable.

Ocimum sanctum L. (Lamiaceae); Tulasi; Pipili-9166; Leaf; Cold, Cough & Fever; Seven leaves are given with honey before rising the Sun to treat cold, cough and fever.

Pongamia pinnata (L.) Pierre (Fabaceae); Karanjo; Kanti-9103; Seed; Seeds oil is applied locally to treat body pain.

Toddalia asiatica (L.) Lam. (Rutaceae); Tundupora; Konark-9220; Leaf, Fruit; Edible; Leaves are cooked and eaten as vegetable. Ripe fruits are eaten raw by the local people.

Xanthium indicum Koenig. (Asteraceae); Agara; Kanti-9111; Fruit; Fruits are tagged with cows and goats nipple to stop feeding.

Ziziphus oenoplia (L.) Mill. (Rhamnaceae); Kantakoli; Pipili-9242; Fruit; Fruits are eaten raw by the children.



Results and Discussion

In the present investigation 30 medicinal plants have been recorded to be used for various purposes including the treatment of different diseases like lactation Problems, boils, cuts & wounds, skin diseases, tooth ache, bone fracture, blood dysentery, swelling, joint pain, body pain, cough & cold. The miscellaneous uses of the plants are timber wood, leafy vegetable, edible fruits, worships etc. 30 plants species belonging to 19 families are reported. The utility lies through their roots, bark, latex, leaves, fruits and seeds. These are taken internally or applied externally in the form of infusion, decoction, paste or powder. Most of the plants used in medicines are either mixed with other ingredients or single. Some important medicinal plants needs immediate conservation and their cultivation should be encouraged through which their extinction can be prevented and local village people may also get low-cost cure their disease.

The data on folk medicinal uses have been compared with recent available literature. (Ali *et al.*, 2009, 2010, Aminuddin *et al.*, 2007, 2009, 2010; Anonymous, 2001, 2006, Panda & Misra, 2011; Behera, 2006; Bhadra *et al.*, 2010; Rath, 2005; Dhal *et al.*, 2010; Girach *et al.*, 2006, 2011; Mukesh *et al.*, 2010, 2011a, 2011b; Prusti & Behera, 2007; Rout & Panda, 2010) and found that most of the folk medicinal plants are duly reported in the context of folk claims in the literature. However, their mode of application, ingredient and part used are different. Therefore, the present study represents contemporary folk uses of medicinal plants of the area investigated. It would be worthwhile to subject all these folk drugs to scientific testing in an attempt to discover new drugs of natural origin for many of the diseases, thus far, incurable in modern medicine.

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Need for Pharmacovigilance of Herbal Drugs: Safety and Quality Issues

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Abstract

yurveda, the knowledge of life, immortalized in the form of elegant Sanskrit verses in the Samhitas describes diagnosis and therapy of disease as well as ways to maintain positive health (Dahanukar and Thatte, 1983). Although the technical term "Pharmacovigilance" does not feature in ayurvedic texts, the spirit of pharmacovigilance is vibrant and is emphasized repeatedly in all major texts. The major goals of pharmacovigilance, namely to improve patient care and safety in relation to drug use, and thus promote rational drug use are recurrent themes of ayurvedic pharmacology (Dravyaguna vigyan) and therapeutics (chikitsa). The success of pharmacovigilance system is in the ability to prevent further adverse reaction successfully by understanding and using the information collected. The pharmaceutical and biotech industry is revolutionizing in a manner where innovation and pharmacovigilance are not polarized. The business models are maturing to the next level of niche busters and towards a coexistence of novel and the age old blockbuster strategies. Pharmacovigilance forms the backbone of the product life cycle due to a demand created by the need for new drugs and their regulation. Events such as thalidomide tragedy highlight the extreme importance of effective drug monitoring system for all medicines.

Keywords: Pharmacovigilance, Herbal drugs, Quality control.

Introduction

Pharmacovigilance is the pharmacological science relating to the detection, assessment, understanding and prevention of adverse effects, particularly long term and short term side effects of medicines. Generally speaking, pharmacovigilance is the science of collecting, monitoring, researching, assessing and evaluating information from healthcare providers and patients on the adverse effects of medications, biologicals, herbalism and traditional medicines with a view to:

- 1. Identifying new information about hazards associated with medicines.
- 2. Preventing harm to the patients.

The traditional preparations comprise medicinal plants, minerals, organic matter, etc. Herbal drugs constitute only those traditional medicines which primarily use medicinal plant preparations for therapy. The earliest recorded evidence of their use in Indian, Chinese, Egyptian, Greek, Roman and Syrian

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texts dates back to about 5000 years. The classical Indian texts include *Rigveda, Atherveda, Charak Samhita* and *Sushruta Samhita*. The herbal medicines and traditional medicaments have been derived from rich traditions of ancient civilizations and scientific heritage (Dahanukar and Thatte, 1996).

The safety of herbal medicines has become a major concern to both national health authorities and the general public. The use of herbs in Traditional medicines continues to expand rapidly across the world. Many people now take herbal medicines or herbal products for their health care in different national health-care settings. There is a myth that herbal medicines do not have adverse effects and hence consumed by patients on their own. However, this is not true and herbal products are also likely to have adverse effects if taken without proper guidance. Mass media reports of adverse events tend to be sensational and give a negative impression regarding the use of Herbal medicines in general rather than identifying the causes of these events, which may relate to a variety of issues (Mann and Andrews, 2007).

It is high time we practice pharmacovigilance for herbal products as well. We need to look at the herbal drug regulations of India in comparison with those of highly regulated markets of EU which have been looking upon herbal products as a 'medicine'. It appears that the Indian regulations on herbal medicines are lagging behind the times and this article aims to serve as a reminder of this fact.

Challenges in Monitoring the Safety of Herbal Medicines

The WHO has taken the lead in tackling the need for drug safety monitoring since 1970 (resolution WHA23.13 on international monitoring of adverse reactions to drugs). The WHO International Drug Monitoring Program, together with the WHO Collaborating Centre in Sweden, the Uppsala Monitoring Centre (UMC), has instituted a coherent program of action for pharmacovigilance, which includes the establishment of a program for exchange of safety information, maintenance of the global WHO database of adverse drug reaction (ADR) reports (hereafter referred to as the global WHO database), and the provision of numerous guidelines on monitoring drug safety. It also seeks to bridge the gap between the industry and the regulatory authorities. As an immediate response to the need for pharmacovigilance for herbal medicines, the WHO has increased its efforts to promote their safety monitoring within the context of the WHO International Drug Monitoring Program (Anonymous, 2000; Edwards and Biriell, 1994).

Many herbs have shown positive results in-vitro, animal model or small-scale clinical tests, while studies on some herbal treatments have found negative

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results. The partial list of herbs and herbal treatments with known or suspected adverse effects, either alone or in interaction with other herbs or drugs. They are as listed below (Table-1).

Table 1: List of herbs with known adverse effects

Name of Drug	Scientific name	Adverse effects	Reference
Aconite	Aconitum spp.	Heart palpitations and arrhythmias, hypotension, nausea, vomiting, abdominal pain, respiratory system paralysis	(Craft, 2004)
Aloe vera juice	Aloe vera	Potentially carcinogenic, with others can potentiate cardiac glycosides and antiarrhythmic agents. Cause allergic and toxic contact eczema in rare cases.	(Craft, 2004)
Anthroid laxatives	-	Abdominal pain, diarrhea, potentially carcinogenic, with others can potentiate cardiac glycosides and antiarrhythmic agents	(Aronson, 2009)
Areca nut	Areca catechu	Deterioration of psychosis in patients with preexisting psychiatric disorders; known carcinogen contributing to cancer of the mouth, pharynx, esophagus and stomach when chewed.	(Craft, 2004)
Aristolochic acid	Aristolochia serpentaria	Kidney toxicity associated with kidney failure; associated with development of cancer, particularly of the urinary tract, known carcinogen	(Aronson, 2009)
Atractylate	Atractylis gummifera	Liver damage, nausea, vomiting, epigastric and abdominal pain, diarrhea, anxiety, headache and convulsions, often followed by coma	(Aronson, 2009)
Bitter orange	-	Fainting, arrhythmia, heart attack, stroke, death	(Aronson, 2009)
Broom	Genista tinctoria	Uterotonic properties, nausea vomiting, and diarrhea, contraindicated for pregnancy and breast feeding.	(Aronson, 2009)
Buckthorn bark and berry	Rhamnus frangula	Vomiting and cramp-like prolonged use leads to the loss of electrolytes, especially potassium ions, which can result in hyperaldosteronism, inhibit intestinal motility and, in rare cases, cause cardiac arrhythmia, nephropathy, muscle weakness, edema, muscle weakness and accelerated bone degeneration.	(Craft, 2004)

Name of Drug	Scientific name	Adverse effects	Reference
Cascara Sagrada bark	Rhamnus purshiana	Abdominal pain, diarrhea, potentially carcinogenic.	(Craft, 2004)
Coltsfoot	Tussilago farfara	Liver damage, cancer	(Heather, 2004)
Comfrey		Hepatotoxicity Liver damage, cancer.	(Craft, 2004)
Country mallow	Sida cordifolia	Heart attack, heart arrhythmia, stroke, death	(Craft, 2004)
European Mistletoe	Viscum album	Toxic to cardio and central nervous systems, gastrointestinal bleeding	(Craft, 2004)
Ephedra	Ephedra sinica	Agitation and palpitations, hypertension, irregular heart rate, insomnia, nervousness, tremors and seizures, paranoid psychoses, heart attacks, strokes, and death", kidney stones	(Craft, 2004)
Flavonoids (contained in many medicinal plants)	-	Vomiting, diarrhea, headache, loss of appetite, gynecomastia; signs of overdose range from mild cardiac arrhythmias to life-threatening ventricular tachycardia, atrial tachycardia with AV block, stupor, confusion, hallucinations, impaired vision, depression, and/or psychoses.	(Craft, 2004)
Maidenhair tree	Ginkgo biloba	Mild gastrointestinal complaints, headaches, and allergic reactions are very rare side effects.	(Craft, 2004) (Heather, 2004)
American Ginseng	Panax quinquefolius	Insomnia, hypertension, and edema have been reported as symptoms of overdose.	(Craft, 2004) (Heather, 2004)
Hawthorn	Crataegus monogyna	Potentiates digitalis activity, increases coronary dilation	(Craft, 2004)
Horse chestnut	Aesculus hippocastanum	Allergic reaction, inflammation of the mucous membranes in the gastrointestinal tract can occur as a rare side effect after internal use.	(Craft, 2004)
Kava	Piper methysticum	Potentates CNS sedatives, sedation, oral and lingual dyskinesia, torticollis, oculogyric crisis.	(Craft, 2004)
Khat	Catha edulis	Chronic liver dysfunction	(Craft, 2004)

Name of Drug	Scientific name	Adverse effects	Reference
Liquorice root	Glycyrrhiza glabra	Hypokalemia, hypertension, arrhythmias, edema	(Heather, 2004)
Lobelia	Lobelia inflata	Toxicity, rapid heartbeat, hypotension, coma, death	(Craft, 2004)
Milk thistle	Silybum marianum	Dyspeptic complaints, liver and gallbladder complaints.	(Craft, 2004)
Pennyroyal	Mentha pulegium	Liver damage	
Pyrrolizidine alkaloids		Hepatotoxic and carcinogenic effects, liver damage	(Craft, 2004)
Reserpine	Rauvolfia serpentina	Sedation, inability to complete tasks, mental depression, nasal congestion, increased gastric secretion and mild diarrhea	(Craft, 2004)
Safrole	Sassafras albidum	Liver damage	(Craft, 2004)
Senna	Senna alexandrina (Cassia senna)	Abdominal pain, diarrhea, potentially carcinogenic, with others can potentiate cardiac glycosides and antiarrhythmic agents, liver damage	(Craft, 2004)
Valerian	Valeriana officinalis	Drowsiness, GI upset, headache, palpitations, insomnia, over-sedation, overstimulation	(Craft, 2004)
Yohimbe	Corynanthe yohimbe	Rapid heart rate, hypertension, hypotension, heart problems, death, congestion of gentiles,nausea	(Craft, 2004)

Regulation

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National regulation and registration of herbal medicines vary from country to country. Where herbal medicines are regulated, they may be categorized as either prescription or non-prescription medicines. Herbal products may also be categorized other than as medicines. Moreover, the regulatory status of a particular herbal product may differ in different countries. The national regulatory framework usually also includes involved qualified providers and distributors of the respective substances. Regulatory status consequently determines the access to or distribution route of these products (Mann and Andrews, 2007).

Quality Assurance and Control

Quality assurance and control measures, such as national quality specification and standards for herbal materials, good manufacturing practices (GMP) for herbal medicines, labeling, and licensing schemes for manufacturing, imports and marketing, should be in place in every country where herbal medicines are regulated. These measures are vital for ensuring the safety and efficacy of herbal medicines. Weak regulation and quality control may result in a high incidence of adverse reactions attributable to poor quality of herbal medicines, in particular, resulting from adulteration with undeclared potent substances and/or contamination with potentially hazardous substances and residues (Patel and Patel, 2011).

The requirements and methods for quality control of finished herbal products, particularly for mixture herbal products, are far more complex than for other pharmaceuticals. The quality of such products is influenced by the quality of the raw material used. Good agricultural and good collection practices for medicinal plants, including plant selection and cultivation, are therefore important measures.

Safety Monitoring of Herbal Medicines

The most common sources of information on adverse events and reactions to medicines are clinical trials and spontaneous reports (voluntary, unsolicited communications on marketed medicinal products). The latter ordinarily far exceed the former in numbers and type, especially serious reports, over the lifetime of a product. In some countries, adverse reaction reporting by physicians is mandatory; such reports are regarded as spontaneous (Anonymous, 2004.)

In many countries, providers of herbal medicines other than physicians, dentists, pharmacists, and nurses are excluded from reporting systems. If adequate coverage of herbal medicines is to be achieved, national reporting schemes should be developed to include all providers of herbal medicines (both prescribers and dispensers), and providers of traditional, complementary, and alternative medicine, according to national circumstances (Mann and Andrews, 2007).

Pharmacovigilance Software

PvNET is a comprehensive pharmacovigilance solution with adverse event reporting, adverse drug reactions (ADR) data management and regulatory reporting of ICSR (Individual Case Safety Report) that goes beyond mere compliance (Shetti *et al.*, 2011).PvNET is an across-the-board drug safety software successfully audited against GMP standards, 21 CFR compliance and ICH E2B.



Discussion and Conclusion

Although the National Pharmacovigilance program has encouraged reporting of all suspected drug-related adverse events including those caused by herbal/ traditional/alternative medicines, the number of reports related to ayurvedic / herbal drugs has been abysmally low.

Several challenges that preclude identification and reporting of adverse reaction to ayurvedic drugs can be identified related to detection, assessment and preventation of adverse reaction.

The path is full of obstacles, including method to study drug safety problem which have not evolved in Ayurveda. Although information related to medicines exists in the verses of ancient treatises of ayurveda, it is not easily accessible. Signal detection is difficult because there is an inherent belief about safety of ayurvedic medicines leading to lack of reporting and collection of reports relating to any formulation. Lack of quality assurance and quality control in manufacture of ayurvedic medicines, which act as a confounding factor in diagnosis the adverse reaction. The success of pharmacovigilance system is in the ability to prevent further adverse reaction successfully by understanding and using information collected with ayurvedic medicines is not adequate. The patients are not adequately aware that ayurvedic medicines can cause adverse reaction and can take medicines for years on and with no monitoring as they believe that these medicines can do no harm (Tnatte and Bhalerao, 2008).

In this review, based on observations there are several ways we can move forward in attempting to embrace pharmacovigilance system in ayurveda.

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Ethnomedicinal Studies in Narsinghpur Forests of Athagarh Forest Division, District Cuttack, Odisha

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Abstract

he present study is based on an ethnobotanical survey of Athagarh Forest Division in Cuttack district of Odisha conducted during the years 2010-11. The paper presents 33 folk recipes comprising 33 taxa of folk medicinal plants used by various tribes of this area i.e. Kondh, Munda, Naik, Santal and other local inhabitants etc. for the treatment of various diseases. The folk plants are arranged alphabetically by their botanical names, providing information on their family, collection number with locality, local name, part(s) used, name of the disease(s) against which used, mode of preparation and administration, for each recipe discussed. The data provided will help to discover new drugs of plant origin for many of the diseases, thus far, incurable in modern medicine.

Key Words: Ethnobotanical survey, Medicinal plants, Tribal people, Cuttack, India.

Introduction

India has a century's old tradition of using medicinal plants and herbal medicines for the alleviation of various diseases and ailments, as well as for the promotion of health and happiness. People often look towards the traditional systems of medicine not only for the curative effects of plants, but also to hopefully provide them with elixirs of youth and good health. Ethnomedicine is one of the systems of medicine that is widely practiced among the tribal and aboriginal populations of our country for the treatment of ailments.

The tribal tracts are the storehouses of information and knowledge on the multiple uses of plants. However, such traditional knowledge is rapidly disappearing. There is an urgent need to document this knowledge, as otherwise it will be lost forever. The knowledge of the use of natural plant products amongst our people is truly phenomenal.

District Cuttack is situated in the North latitude 20° 03' and 20° 40' and between East longitude 84° 58' and 86° 20' with narrow strip of land spreading from east to west. The district is surrounded in the Northern to Western by Jajpur, Dhenkanal, and Angul district Western to South by Nayagargh, Khurda and Southern to Eastern by Jagatsinghpur, Kendrapara districts. Topographically, Cuttack has two prominent divisions i.e. hilly terrain on the west and Mahanadi delta plain on the East (Fig. 1). The highly fertile and densely populated land is criss-crossed by rivers and rivulets. These water

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bodies function both as tributaries and distributaries of the Mahanadi river system. Large portion of the land mass is low lying and gets submerged during monsoon. People of Cuttack largely depend upon agriculture as the primary means of livelihood.



Fig. 1: Map of the Study Area

The Cuttack district has different types of forest vegetation i.e. evergreen forest, sal forest, dry deciduous forest, and scrub type and provide home to the occupant tribes, apart from the rural population of the district. All these people practice mainly agriculture. The tribal communities Kondh, Munda, Naik etc., are settled in different places of the study areas. Now, it has become necessary to collect such information from every nook & corner of the country as the wave of modernization and urbanization is putting long strides. With this viewpoint, the medicinal folklores have been tapped. The Survey Team of Regional Research Institute of Unani Medicine, Bhadrak surveyed Cuttack district during the years 2010-11 and collected plant specimens for Herbarium.

Materials and Methods

Frequent field trips were undertaken in order to ethnobotanical survey of the inhabitants of the Cuttack district and to make collections of native medicinal plants. Information regarding medicinal plants was obtained in meetings i. e. personally interview with tribal people who practiced indigenous medicine. In many cases, it was first necessary to gain a good rapport with these people in order to win over their confidence. Most of the information included in this study was gathered from elderly and experienced practitioners who were very



knowledgeable about medicinal plants. Our field notebook delineates all the usage procedures adopted by these tribal people. The gathered data were cross-checked for reliability and accuracy by interacting with different groups of the tribals from different habitats to confirm the use, mode of administration and dosage differences of the herbal materials, if any. After eliciting detailed information regarding the wild medicinal plants, the collected materials were carefully brought to the Survey of Medicinal Plants Unit, Regional Research Institute of Unani Medicine, Bhadrak for identification and processing. Herbarium sheets for all the voucher specimens were prepared and deposited in the Herbarium of Survey of Medicinal Plants Unit, Regional Research Institute of Unani Medicine, Bhadrak, India.

The medicinal plants were botanically identified by using the *Flora of Orissa* (Saxena & Brahmam, 1994-1996) and the *Botany of Bihar & Orissa* (Haines, 1921-25). Confirmation of the identifications was made through the comparison of our specimens with those housed in the Herbarium of the Survey of Medicinal Plants Unit, Regional Research Institute of Unani Medicine, Bhadrak.

Enumeration

The medicinal plants used as folk medicine in the study area are arranged in alphabetical order. Their botanical name, family in bracket, collection number with locality, local name, part used, name of the disease(s) against which used, mode of preparation and administration and Informant who shared his valuable information are given for each recipe discussed.

Aegle marmelos (L.) Corr. (Rutaceae); 8855; Belo; Leaf; Boils; Leaves paste is cooked in cow's Ghee and applied lukewarm on boils for healing wounds. Kondh.

Alangium salvifolium (L.f.) Wang. (Alangiaceae); 8881; Ankulo; Stem Bark; Joint Pain; Stem bark, leaves of Bisalyakarni (*Tridax procumbens*) & Sonargada (*Grewia hirsuta*) in equal quantity are made into paste and boiled in Jada (*Ricinus communis*) oil. Resultant oil is applied locally on joints to relieve pain. Kondh.

Ampelocissus divericata (Wall. *ex* Lawson.) Planch (Vitaceae); 8851-Badabhuin; Kanjokanjia; Plant; Animal wounds; Plant paste is applied on infested neck wounds of domestic animals for healing of wounds.

Andrographis paniculata (Burm.f.) Wall. ex G.Don (Acanthaceae); 8850; Bhuineem; Leaf; Scabies; Leaf paste is applied locally on scabies. Kondh.


Anogeissus latifolia (Roxb. ex DC) Wall. (Combretaceae); 8849-Badabhuin; Dhouda; Stem Bark; Diarrhoea; 5 gm stem bark powder is given twice a day with water to treat diarrhoea.

Argyreia nervosa (Burm.f.) Boj (Convolvulaceae); 8872; Hathikano; Root; Joint Pain; A handful roots of this plant and root bark of *Calotropis gigantea* (Arakh) in equal quantity powdered and made into pills of pea size. Two pills are given with milk for one month to get relief from joints pain. Kondh.

Asparagus racemosus Willd. (Liliaceae); 8843-Bhizipada; Chhatuari; Root; Spermatorrhoea; Powdered root with sugar candy juice is given 20 gm once daily at bed time to treat Spermatorrhoea.

Atylosia scarabaeoides (L.) Benth. (Fabaceae); 8860-Badabhuin; Ban Kulthia; Seeds; Anthelmintic; 3 gm seed powder mixed with ghee is taken as anthelmintic drug to expel tapeworm. Kondh.

Bridelia retusa (L.) Spreng (Euphorbiaceae); 8844- Bhizipada; Kantakassi; Stem bark; Diarrhoea; 10 gm of stem bark paste is given twice daily with sufficient water to check diarrhoea.

Cajanus cajan (L.) Huth (Fabaceae); 8858-Badabhuin; Harar; Leaf; Jaundice; 5-10 gm of leaves powder is given with curd twice a day for 7 days to the treat jaundice. Kondh.

Cipadessa baccifera (Roth.) Miq. (Meliaceae); 8847-Badabhuin; Nalbalia; Twigs; Dental Care; Twigs are popularly used for brushing teeth to strengthen gum. Kondh.

Cleistanthus collinus (Roxb.) Benth ex Hook.f. (Euphorbiaceae); 8839-Bhizipada; Karoda; Fruit; Skin diseases; Purified fruits are boiled in mustard oil, cooled and filtered. Resultant medicated oil is used locally in scabies and other skin diseases.

Cocculus hirsutus (L.) Diels. (Menispermaceae); 8887; Dahdaiya; Leaf; Headache; Leaf paste is applied on forehead to get relief from headache. Kondh.

Curculigo orchioides Gaertn. (Hypoxidaceae); 8840- Bhizipada; Talmuli; Root; Spermatorrhoea; Root of this species with roots of Satabari (*Asparagus racemosus*) is pounded together and taken 5-10 gm daily with milk at bed time for one month to treat spermatorrhoea.



Cuscuta reflexa Roxb. (Cuscutaceae); 8871; Nirmuli; Plant; Sprain; Plant prepared in mustard oil is applied warm on sprain to get relief from pain. Kondh.

Elephantopus scaber L. (Asteraceae); 8841- Bhizipada; Mayurchudia; Root; Diarrhoea; 5-10 gm root powder is taken two times daily with sufficient water to treat diarrhoeal problems.

Hemidesmus indicus (L.) R.Br. (Periplocaceae); 8842-Bhizipada, Chimannoi; Root; Skin diseases, Diarrhoea; Powdered root in desired quantity is taken two times daily to treat diarrhoea and skin diseases.

Holarrhena pubescens (Buch.-Ham.) Wall. *ex* G.Don (Apocynaceae); 8857-Badabhuin; Kuring; Stem bark; Dysentery; 5 gm of stem bark powder is given with sufficient water/curd twice a day to treat chronic dysentery. Kondh.

Hybanthus enneaspermus (L.) F.v. Muell. (Violaceae); 8836-Malasahi; Madanmast; Plant; Jaundice; 30 ml of plant juice is given with required quantity of sugar twice a day for the treatment of jaundice.

Leonotis nepetaefolia R. Br. (Lamiaceae); 8894; Bhutabiari; Root; Menstrual problems; One teaspoon root decoction is given every morning for about one week to treat excess bleeding during menstruation. Kondh.

Lygodium flexuosum (L.) Sw. (Lygodiaceae); 8845-Bhizipada; Kala Mahajal; Root; Menorrhagia; A handful of roots boiled in sufficient water, strained and cooled. 20 ml of resultant liquid is given twice a day for week to treat menorrhagia. Kondh.

Ocimum canum Sims (Lamiaceae); 8874; Tulasi; Seed; Eye complaint; Seeds are placed on eye to remove impurities such as foreign particles, to treat redness etc. Kondh.

Phyllanthus reticulatus Poir. (Euphorbiaceae); 8884; Jhojhang; Leaf; Swelling; A handful of leaves are boiled in sufficient mustard oil and applied warm on affected parts to subside swelling. Kondh.

Pterospermum xylocarpum (Gaertn.) S. & W. (Sterculiaceae); 8862-Badabhuin; Giringa; Flowers; Diarrhoea & Dysentery; A handful of dried flowers are made into powder and 5-10 gm powder is taken with sufficient water two times daily to check diarrhoea and dysentery. Kondh.

Scoparia dulcis L. (Scrophulariaceae); 8837-Bhizipada, Chirorito; Root; Jaundice; 3 cm long root is powdered, mixed with rice water (starchy water) in required quantity and taken for three days to treat jaundice.

Smilax perfoliata Lour. (Smilacaceae); 8846-Bhizipada; Mutturi; Twigs; Toothache; Tender twigs are used for brushing teeth to strengthen gums and check bleeding. Kondh.

Solanum virginianum L. (Solanaceae); 8853-Badabhuin; Akranti; Fruit; Toothache; Fruit/seed decoction is prescribed for gargling to get relief from toothache. Kondh.

Strychnos nux-vomica L. (Strychnaceae); 8882-Anantprasad; Kochila; Seed; Joint Pain; Seed kernel of purified seeds is powdered and 3 gm powder is taken orally with milk twice a day to treat joints pain. Kondh.

Tephrosia purpurea (L.) Pers. (Fabaceae); 8859-Badabhuin; Kulthia; Root; Stomachache; 3-5 gm root powder is given with water two times daily to get relief from stomachache. Kondh.

Terminalia chebula Retz. (Combretaceae); 8856-Badabhuin; Harida; Leaf; Eczema (Dermatitis); A handful of leaves made into paste with water, is applied on eczematous lesions. Kondh.

Tridax procumbens L. (Asteraceae); 8877; Bishalyakarani; Cuts; Leaf; Crushed leaves are directly applied on minor cuts to check bleeding and get relief from pain. Kondh.

Wrightia arborea (Dennst.) Mabb. (Apocynaceae); 8865-Badabhuin; Nata Kurma; Stem bark; Swelling; Stem bark made into paste is applied on inflamed body parts to reduce swelling. Kondh.

Ziziphus mauritiana Lam. (Rhamnaceae); 8870; Kantakoli; Stem bark; Headache; Stem bark made into paste is applied on forehead to treat headache. Kondh.

Results and Discussion

In the present study some traditional therapeutic methods employed by the natives of the Cuttack district have been discussed. Out of 267 species of medicinal plants collected and identified from the study area 33 are used locally in folk medicines by local tribals and other ethnic people i.e. Kondh, Naik, Munda and other rural folks etc. for the treatment of various diseases including animal wounds, boils, cuts, dental care, diarrhoea & dysentery, eye complaint, headache, jaundice, joint pain, menstrual problems, skin diseases, spermatorrhoea, sprain, stomachache, and swelling.

The data on folk medicinal uses have been compared with published available literature. (Ali *et al.*, 2010, Anonymous, 2001, 2006; Chopra *et al.*, 1992; Girach *et al.*, 2011; Jain 1991, Jain & Rao 1967; Khare, 2007; Kirtikar & Basu, 1935; Mukesh *et al.*, 2010, 2011; Rout *et al.*, 2009; Tribedi *et al.*, 1982) and found that most of the folk medicinal plants are duly reported in the literature, however, mode of administration, ingredients and part used are different. Therefore, the present study represents contemporary folk uses of medicinal plants of the district Cuttack. It would be worthwhile to subject all these folk drugs to scientific testing in the context of claims reported herein.

The collection, identification and documentation of ethno-medicinal data on biological resources are inevitable steps for bio-prospecting. These plants may serve as source of some important medicine against some major diseases. Therefore, these tribal claims should be further validated scientifically.

Most plants used by tribal and traditional communities are easily available in forests, near huts or in villages. It is easy to fetch them. Generally plants are used in a crushed form. This study established that many different parts of the plant species are used as medicine e.g. root, leaf, stem bark, twigs, flowers, fruit, seed, whole plant, etc. The most commonly used plant parts are roots and leaves. Amongst 33 plant species, roots of 9 species, leaves of 7 species, stem bark of 6 species, twigs of 2 species, flowers of 1 species, fruits of 2 species, seeds of 3 species and whole plant of 3 species are used for the treatment of various diseases (Fig. 2).



Fig. 2: Number of Uses of Plant Parts



Disease-wise distribution of plants i.e., Animal wounds 1, Anthelmintic 1, Boils 1, Cuts1, Dental Care 3, Diarrhoea 7, Eye complaint 1, Headache 2, Jaundice 3, Joint Pain 3, Menstrual problems 2, Skin diseases 4, Spermatorrhoea 2, Sprain1, Stomachache 1, Swelling 2 Fig. 3.



Fig. 3: Uses of Plants in Different Diseases

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Ethnoveterinary Practices in Uttarakhand Himalayas: Survey of Medicinal Plants for Gastrointestinal disorders

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Abstract

n extensive field survey of age-old veterinary practices of the Uttarakhand Himalayas, which is inhabited by hill communities and ethnic groups, was made during 2005-2008 along with detailed screening of available secondary data. In the study, the main emphasis was given to documentation of folk-lore veterinary knowledge for the treatment of gastrointestinal diseases. A total of 32 plants were recorded with their veterinary folk uses from the area investigated.

Key words: Ethnoveterinary medicines, Gastrointestinal diseases, Uttarakhand Himalayas.

Introduction

The Uttarakhand state which came into existence on November 9, 2000 as the 27th state of India is bounded by China (Tibet) on the north, Nepal on the east. Uttar Pradesh on the south and Himanchal Pradesh on the north-western boundary and lies between 28° 53' 24" and 31° 27' 50" N latitude and between 77° 34' 27" and 81° 02' 22" E longitudes (Fig.1). The state embodying the Kumaon and Garhwal Himalayas with a geographical area of about 53, 483 sq. km. with 13 districts viz. Almora, Bageshwar, Chamoli, Chapawat, Dehara Dun, Haridwar, Nainital, Pauri, Pithoragarh, Rudrapryag, Tehari, Udham Singh Nagar and Uttarkashi. The state is divisible into four major geologic formations viz. (i) Siwalic Himalaya (ii) Lesser Himalaya (iii) Greater Himalaya and (iv) Trans-Himalaya. From folk-cultural point of view, the state exhibits great ethnic and cultural diversity. Garhwalies and Kumaonies are the principal community of the state. Besides this, the Bhotias, the Rajis, the Tharus, the Bhoxas and the Jaunsaries are the important tribal communities inhibit the state. In Uttarakhand Himalaya, livestock occupies a very important place in human life. It is an integral part of agriculture-based economy of Uttarakhand. More than 70% of the rural population of Uttarakhand Himalaya depends upon animals for their economical needs. In this region, every land-cultivating house, attempts to maintain a pair of bullocks for ploughing purpose, a cow and a buffalo for milk and calves for replacement of bullocks. In remote and higher altitude regions, the peoples are also maintaining sheep for wool and horses/mules for transport purpose (Tiwari & Pande, 2011). Diseases are basic problems for both the human being and animals. Ethnic groups and villagers of Uttarakhand Himalaya totally depends on natural resources like plant, plant products, animal products, minerals, soils, etc which are available in their surroundings

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for the treatments of diseases and disorders of their cattle. Gastrointestinal diseases like stomachache, dysentery, diarrhea, tympany, indigestion and constipation are very common and day to day problems in cattle. Present communication deals with the 32 plants which are used by the locals for the treatment of gastro-intestinal diseases in the study area (Fig. 1).



Fig. 1: Study Area

Material and Methods

Remote areas of Uttarakhand Himalaya were surveyed during the years 2005-2008 and ethno-veterinary information related to gastrointestinal diseases were collected through interviewing the local medicimen and experienced people. The information were further verified by cross checking with other knowledgeable person of the study area. Detailed available secondary data (Gaur *et al.*, 1992, Samal *et al.*, 2002, 2003, Tiwari and Pande, 2004, 2005, 2006, 2006a, b, 2009, 2010, 2011; Bisht *et al.*, 2004, Pande *et al.*, 2006, Shah *et al.*, 2007; Tiwari *et al.*, 2007; Pande *et al.*, 2007; Shah *et al.*, 2008; Tiwari *et al.*, 2011, Agnihotri *et al.*, 2012) related to veterinary practices were also screened. Voucher plant specimens were identified with the help of floras and deposited in the herbarium of Botany Department, Kumaon University,

S.S.J Campus, Almora. The ethno-veterinary medicinal data are presented alphabetically by scientific names of plants (Table 1).

S. No.	Plant species	Family	Vernacular Name	Plant Parts	Diseases and disorders
1.	<i>Acacia catechu</i> (L.f.) Willd.	Mimosaceae	Khair	Stem	Dysentery, diarrhoea
2.	Aconitum heterophyllum Wall. ex Royle	Ranunculaceae	Atis	Root	Stomachache, dysentery, diarrhoea
3.	Allium cepa L.	Alliaceae	Piyaj	Bulb	Dysentery, diarrhoea, constipation, indigestion,
4.	Amaranthus caudatus L.	Amaranthaceae	Marsha	Leaf	Dysentery
5.	<i>Arisaema</i> <i>intermedium</i> Blume	Araceae		Tuber	Dysentery
6.	<i>Artemisia</i> <i>elegantissima</i> Pamp.	Asteraceae	Pati	Leaf	Diarrhoea, dysentery
7.	<i>Atylosia</i> <i>scarabaeoides</i> (L.) Benth.	Fabaceae		Leaf	Diarrhoea, dysentery
8.	<i>Betula utilis</i> D. Don	Betulaceae	Bhoojpatra	Gum	Dysentery
9.	Brassica campestris L.	Brassicaceae	Sarson	Oil	Dysentery, constipation, tympany, stomachache, indigestion
10.	Cannabis sativa L.	Cannabaceae	Bhang	Resin	Stomachache, dysentery, indigestion
11.	Carum carvi L.	Apiaceae	Kalajeera	Seed	Digestive troubles, dehydration, gastric troubles

 Table 1:
 Medicinal species used for Gastrointestinal diseases in Uttarakhand
 Himalayas



S. No.	Plant species	Family	Vernacular Name	Plant Parts	Diseases and disorders
12.	Coriandrum sativum L.	Apiaceae	Dhanyiya	Whole plant	Dehydration, dysentery, diarrhoea, constipation, indigestion, tympany
13.	<i>Elettaria cardamomum</i> (L.) Maton.	Zingiberaceae	Elaichi	Seed	Dysentery, diarrhoea
14.	<i>Eleusine coracana</i> (L.) Gaertn.	Poaceae	Mandua	Seed	Dysentery
15.	Foeniculum vulgare Mill.	Apiaceae	Sanuf	Seed	Diarrhoea, dysentery stomachache, indigestion
16.	<i>Glycine max</i> (L.) Merr.	Fabaceae	Bhatt	Seed	Dysentery, diarrhea, tympany, flatulence, indigestion
17.	<i>Grewia optiva</i> J.R. Dumm. ex Burrett	Tiliaceae	Bhimal	Leaf	Indigestion, constipation, dysentery, diarrhoea
18.	Hordeum vulgare L.	Poaceae	Jau	Seed	Dysentery
19.	Linum usitatissimum L.	Linaceae	Alasi	Seed	Dysentery
20.	<i>Mentha arvensis</i> L.	Lamiaceae	Paudina	Leaf	Tympany, constipation, dysentery, diarrhoea
21.	<i>Mentha piperita</i> L.	Lamiaceae	Podina	Leaf	Dryness, dysentery
22.	<i>Myrsine semiserrata</i> Wall.	Myrsinaceae	Gaunta	Gum	Diarrhoea, dysentery
23.	Origanum vulgare L.	Lamiaceae	Bantulsi	Whole plant	Diarrhoea, dysentery



S. No.	Plant species	Family	Vernacular Name	Plant Parts	Diseases and disorders
24.	<i>Picrorhiza kurrooa</i> Royle ex Benth.	Scrophulariaceae	Kutki	Root	Digestive troubles, dysentery, diarrhoea
25.	Piper nigrum L.	Piperaceae	Kalimircha	Fruit	Constipation, diarrhoea
26.	Raphanus sativus L.	Brassicaceae	Mooli	Root	Tympany, dysentery, diarrhoea
27.	<i>Rheum australe</i> D.Don	Polygonaceae	Dolu	Root	Indigestion, dysentery, constipation
28.	Ricinus communis L.	Euphorbiaceae	Arandi	Root	Constipation, dysentery
29.	<i>Rumex</i> <i>nepalensis</i> Spreng.	Polygonaceae	Jangli-palak	Root	Diarrhoea, dysentery
30.	Sesamum orientale L.	Pedaliaceae	Til	Seed	Constipation, dysentery, tympany, flatulence
31.	<i>Trachyspermum ammi</i> (L.) Sprague	Apiaceae	Ajwain	Seed	Diarrhoea, dysentery, indigestion, gastric troubles, mouth blisters, tympany, stomachic, constipation
32.	Zingiber officinale Rosc.	Zingiberaceae	Adrak	Rhizome	Indigestion, constipation, dysentery, diarrhoea, stomachache, tympany, stomachic

Conclusion

The study reveals that presently the people of Uttarakhand Himalayas have been using 32 plants species for the treatment of gastro-intestinal diseases

among their animals. The methods of treatments are totally traditional and come from their ancestors through the word of mouth. Diarrhoea, dysentery, indigestion and constipation are the common gastro-intestinal diseases of cattle in the study area. Out of 32 plant species, the study reveals that 16 are common edible species viz., Allium cepa L., Amaranthus caudatus L., Brassica campestris L., Carum carvi L., Coriandrum sativum L., Elettaria cardamomum (L.) Maton., Eleusine coracana (L.) Gaertn., Foeniculum vulgare Mill., Glycine max (L.) Merr., Hordeum vulgare L., Mentha piperita L., Piper nigrum L., Raphanus sativus L., Sesamum orientale L., Trachyspermum ammi (L.) Sprague and Zingiber officinale Rosc. However, this important veterinary knowledge is in danger of extinction due to rapid modernization. This information has survived only by being passed from one generation to next so far. Now-a-days young generation does not take the interest in (local) animal husbandry practices. Hence there is a need to document this knowledge before it is lost forever. Detailed chemical and pharmacological investigations of these folk plants are suggested for developing the new veterinary formulations and drugs for curing gastrointestinal diseases.

Medicinal plants used for gastrointestinal disorders in Uttarakhand Himalayas



Fig. 1: Aconitum heterophyllum Wall. ex Royle



Fig. 2: Betula utilis D. Don



Fig. 3: Cannabis sativa L.





Fig. 4: Carum carvi L.



Fig. 5: Foeniculum vulgare Mill





Fig. 6: Grewia optiva J.R. Dumm. ex Burrett



Fig. 7: Picrorhiza kurrooa Royle ex Benth





Fig. 8: Rumex nepalensis Spreng

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