Original Article

Screening of Some Herbal Medicines for Psychopharmacological Activity

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ABSTRACT

Objectives: In our present study, we evaluate the effectiveness of these drugs as Psychotropic agents and accessed by biochemical-parameters.

Study Design: Experimental and Observational Study.

Place and Duration of Study: This Study was conducted at the Faculty of Pharmacy, Hamdard University, Karachi from Jan 2009 to June 2009.

Materials and Methods: Study on Mice [Part-A]: Rats (weighing 180-250g) and Mice (22-32g) either sex were used in this study. One group was kept as control for both drugs. Mice were kept under room temperature. Part B: Study on Rats: The effect of herbal medicine and homeopathic drugs are investigated on psychotrophic parameters of rats. Doses were given according to the body weight of rats.

Results: Screening of herbal medicine as psychotropic drugs has strong modulating effect on brain and behavior. Majority of Pakistani population lives in far-flung rural area where modern medicines are not easily available, so they rely on traditional herbal medicines for relief. This signifies the importance of Eastern system of medicine in our society and stresses the need of research on herbal medicines like. Some of the herbal drug Reserpine, Nux-Vomica, Anacardium and Chlorpromazine with a wide range of pharmacological actions. Among these, Strychnos Nux-Vomica has strong action on cholinergic system, CNS activity and observed as a antispasmodic. Rauwolfia serpentine is an active alkaloid particularly present in reserpine are used to treat essential hypertension and in certain neuropsychiatry disorders. It has a sedative and tranquilizing effects, as it depletes catecholamine from the central nervous system.

Conclusion: Keeping in view, the medicinal importance of these herbs, our present study was designed to screen these herbs as for CNS activity on Albino mice and rats.

Key words: Herbal Medicines, Psychotropic drugs, Mices and Rats.

INTRODUCTION

Products based or herbal medicine are one of the major frontiers of research. The apparent simplicity of herbal-product after experimental studies proved to be deceptive. Central nervous system effects have been studied more extensively because of its easy availability and its involvement in many symptoms such as depression catalepsy, convulsions and coma etc. Depression is of the most common public health problem of developing countries[1],

Depression is one of the major nervous system problem in Pakistan. Majority of Pakistani people are hypertensive and most of them have certain neuropsychiatric disorders. Many new structural-analogues are being developed in the management of psychiatric illnesses and effect memory. In our study, the effects of some herbal medicine were observed for psychopharmacological profile. Chemical investigation of the herbal drugs help us in exploring another use of these herbs / alkaloids and / or better understanding of adverse effects that could be seen by the use of these herbal-products[2].

Nux-Vomica is the dried ripe seed of strychnos nux-vomica Linne belongs to (Family-Loganiaceae). Strychnos is the Greek name for a number of poisonous plants. Nux-vomica derived from two Latin words that means a nut that causes vomiting[3].

Nux-vomica tree is about 12 meters tall, grows in Sri Lanka, India and North Australia[4]. The seeds, bark and leaves of strychnos nux-vomica contain strychnine, a highly poisonous substance that seriously damages the nervous system[5].

Strychnine in minute doses has a beneficial effect on body, supporting the digestive system and improves urination. In high doses, strychnine is extremely toxic as a CNS stimulant[6]. The alkaloid produces excitation of all parts of the CNS and blocks inhibitory spinal impulses at the postsynaptic level. This results in toxic convulsions. Brucine is less toxic than strychnine and is used commercially as an alcohol denaturant[7].

Rauwolfia-Serpentina is a snake root plant belongs to the Apocynaceae. Rauwolfias are evergreen shrubs and trees. Extracts of rauwolfia-serpentina have been used. Primarily as Ayuvadic medicine for a variety of conditions including snakebite, hypertension, insomnia

and insanity[8]**.** The active constituents of rauwolfia-serpentina are indole alkaloids such as reserpme, rescmnamme, yohimbine, ajmaline and serpentine. In 1940, Indian physician had recognized two distinct properties of rauwolfia, one as a hypotensive effect and other as a sedative effect. They began using the agent for clinical-purpose[9]. After the isolation of reserpine in 1952, it was used to lower high blood-pressure, and it's property of producing severe depression as a side-effect also made it useful in psychiatry to use it as a tranquilizer in the control of agitated psychotic-patients[10].

Reserpine produces its antihypertensive effects through depletion of catecholamine (adrenaline and noradrenalin) from peripheral sites. The hypotensive effect is mainly due to a reduction in cardiac output and peripheral resistance. Large doses causes hypothermia and respiratory depression. The cardiovascular effect of reserpine includes hypotension, reduced heart rate and cardiac output. The hypotensive response of the drug is due to impairment of adrenergic-transmission results in increased parasympathomimetic effects including increased gastric acid secretion, G.I hypermotility and miosis[11].

Anacardium is the marking nut of the Semecarpus Anacardium, a small tree belonging to the Anacardiaceae. A tincture is prepared from the crushed seeds (marking nut). The anacardium patients suffer from a very peculiar and contradictory state of mind such as laughing at serious matters and serious over trifling things. They also suffer from fixed ideas as their mind and body is separate; they suspect everybody and everything around them. They are also subject to illusions of hearing and smell. Anacardium patients have a peculiar sensation of a hook or a pin on the surface of the body as also a sensation of a plug causing a pressing penetrating pain. These sensations whenever present and in whatever ailment will make it a first rare, remedy[12].

Chlorpromazine is a classical neuroleptic. It acts on particular areas of brain to decrease dopaminergic neuronal firing. It is used as a standard psychotropic[13].

MATERIALS AND METHODS

Study on Mice [Part-A]

Rats (weighing 180-250g) and Mice (22-32g) either sex were used in this study. One group was kept as control for both drugs. Mice were kept under room temperature. Tap-water was allowed ad-Libitum. Following drugs and corresponding doses were used:

Animals

Animals were observed during and after 21 days. Tablets crushed in 10ml of water 1cc was given. Screening methods used were: Head dip, Open field, Home cage activity, Stationary-Rod & Swimming induced-despair.

Table 1.1:

S. No.	Drug	Dosage
1	Reserpine	0.06 mg
2	Nux-Vomica	0.07mg.
3	Anacardium	0.08mg
4	Chlorpromazine	100mg /60 kg

Table 1.2: Table of Behavioural Pattern of Animals (Mice)

S. No	Drug	Dosing				
		1	2	3	4	5
1	Control	-	-	-	-	-
2	NUX-VOMICA	0.06	0.06	0.07	0.08	0.09
3	Reserpine	0.06	0.06	0.07	0.08	0.09
4	Anacardium	0.06	0.06	0.07	0.08	0.09
5	Chlorpromazine	0.06	0.06	0.07	0.08	0.09

Table 1.3: Table of Significant and Non Significant Effect of Drugs

S. No	Drug	Head Dip	Open Field	Statio-nary Rod	Home Cage Activity	Swim-ming Induced Despair
1	Control	↑↑	↑↑	↑↑	↑↑	↑↑
2	NUX-VOMICA	↑↑	↓↓	↓↓	↑↑	↑↑
3	Reserpine	No Significant Effect	Not Much Effect	↓↓	No Significant Effect	No Significant Effect
4	Anacar-dium	↓↓	↓↓	↓↓	↓↓	↓↓
5	Chlorpro-mazine	↓↓	↓↓	↓↓	↓↓	↑↑

Table 1.4: Table of Behavioural Pattern of Animals (Rat)

S. No.	Drug	DOSING				
		1	2	3	4	5
1	Control	-	-	-	-	-
2	NUX-VOMICA	0.2	0.2	0.3	0.4	0.5
3	Reserpine	0.2	0.2	0.3	0.4	0.5
4	Anacardium	0.2	0.2	0.3	0.4	0.5

Part B: Study on Rats

The effect of herbal medicine and homeopathic drugs are investigated on psychotrophic parameters of rats. Doses were given according to the body weight of rats.

All these animals were fasted for 24 hours then they were trained on different models. Different doses were given to them for 21 days. After 21 days of dosing, the activity is seen on different models.

Table 1.5: Table of Significant and Non Significant Effect of Drugs

S. No	Drug	Open field	Swimming induced despair	Light and dark box	Home cage activity	Radial maze
1	Control	↑↑	↑↑	↑↑	↑↑	↑↑
2	NUX-VOMICA	↓↓	No Effect	No Effect	↓↓	↓↓
3	Reserpine	No Significant Effect	No Effect	↓↓	No Significant Effect	No Significant Effect
4	Anacardium	↓↓	No Effect	No Effect	↓↓	↑↑

Effect of herbal drugs on exploratory activity

1. **Open Field:** Significant reduction of exploration on open field activity was noted as compared to control rats.
2. **Swimming Induced Despair:** There was no effect on swimming induced despair. There was no effect on food and water intake.
3. **Light And Dark Box:** There was significant effect of reserpine on light and dark box activity. Significant decreases in time spent by "reserpine treated rats" in light box was observed. No effect was observed on light and dark activity box in other medicines treated rats.
4. **Cage Crossing (Home Cage Activity):** There was no effect on home cage activity by any of the herbal medicine used in the experiment.
5. **Radial Maze:** There was significant reduction of exploration **observed** due to the nux vomica and reserpine in the radial maze. Anacadium did not produce significant reduction of exploration as compared to control.

Table : 1.6: Effect Of Herbal Drug On Exploratory Activity Of Mices

Treatment	Head Dip	Open Field	Cage Crossing	Stationary Rod
Control	70.±6.35	205±3.7	108.6±5.84	0.70±0.46
Reserpine	*62.2±43.4	197. ±168.8	102.8±92.4	0.63±0.47
Nux-Vomica	*39.8±28.8	167.2±160.4	103±90.8	5.2±5
Anacardium	*37.2±28.6	160.4±216.6	86.6±61.8	4.2±4.4
Chlorpromazine	39.4±32.4	*207±169.4	90.8±74.8	2.62±1.7

Values are mean ± S.E.M. (n=5) significant differences by student t-test * P<0.05, **P<0.1 as compared to control

Table : 1.7: Effect of Herbal Drug On Exploratory Activity of Rats

Treatment	Open Field	Radial Maze	Cage Crossing
Control	80.4±43.3	2.6±5.11	27.8±14.27
Nux-Vomica	54.8±50.8	4.6±3.6	40.2±29.8
Reserpine	76.2±130.4	*2.2±1.2	22.6±36.6
Anacardium	70.2±104	1.38±1.46	*43.6±40.6

Values are mean ± S.E.M. (n=5) significant differences by student t-test * P<0.01 as compared to control.

RESULTS

Part A: Study on Mices

Effect of herbal drugs on exploratory activity:

1. **Head Dip:** Significant reduction of exploration on Head Dip was noted.
2. **Open Field:** Nux-vomica, Anacardium and Chlorpromazine produced a significant reduction of exploration but reserpine did not produce effect on open field activity.
3. **Home Cage Activity:** Reserpine Anacardium and Chlorpromazine decreased the activity of cage crossing but increased Nux-vomica.
4. **Stationary Rod:** Reserpine Anacardium and Chlorpromazine impaired the stationary rod response but no change was observed on stationery rod by Nux-vomica
5. **Swimming Test:** Reserpine and Anacardium decreased the activity of swimming. Chlorpromazine produced no effect on swimming

induced stress but Nux-vomica produced excitation on swimming.

DISCUSSION

This study is aimed to evaluate different behavioral changes produced by the healing properties of herbs that are at last being scientifically investigated. There are two main focuses of this research. One, is the examination and other was the evaluation of the effectiveness of some herbal extracts using assessment tools for behavior. This research provided a scientific basis for the comparison of herbal and homeopathic remedies. The other direction of research is the search for the newer drugs among known plants or in new plant species[14]. To establish herbalsim on scientific grounds, Psychopharmacological screening must be carried out. Psychopharmacological screening generally turned so as to indicate simply the presence or absence of a response. Thus, the fundamental elements of a drug discovery program are the bioassays used to detect substances with biological activities. The CNS screening included Open field activity, Cage crossing, Swimming induced depression, Radial-maze. There was a group in which 6 per group and one group was kept as control. They were provided with food and water ad-libitum and different CNS screening tests were performed. During the course of present study, three herbs Rauwolfia-Serpentina, Nux-Vomica and Anacardium were studied. Pharmacological screening of Reserpine, Nux-Vomica, Chlorpromazine and Anacardium was carried out. Rauwolfia-Serpentina has been used since centuries in folk medicine in East India. Reserpine is now used as antihypertensive and tranquilizer in western medicine[15]. Chronic reserpine treatment showed a non significant effect on water intake. Previously, it was reported that reserpine increased water intake in the light phase and the animal consumed less water in the dark phase. Other herbal drugs such as Nux–vomica and Anacardium did not produce remarkable effect[16].

In the present study, motor activity is significantly decreased in an open field. Reserpine treatment induced hypo locomotion mediated by nigral dopaminergic dysfunction[17] producing few affect on peripheral movements, rearing, grooming, immobility and defecation[18]. Nux-vomica and anacardium did not show significant effects. In conclusion, the present results show that oral intake of rauwolfia serpentoina in rats and mice's brings about behavioral changes. Reserpine affects feeding behavior and body weight.

CONCLUSION

Keeping in view, the medicinal importance of these herbs, our present study was designed to screen these herbs as for CNS activity on Albino mice and rats.

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