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RESEARCH ARTICLE

Ethno Botany of Some of The Medicinally Important Threatened Plants of Kashmir Himalayas, India.

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Abstract

A survey for medicinally important threatened plants was carried out in the hilly and mountainous areas of district Ganderbal (Kashmir Himalayas), to document the diversity of traditional health care remedies currently practiced by the local people. The study was aimed at exploring the medicinal importance of threatened plants and the main causes behind their threat status which has till date remained unexplored. The study in addition to ethno medicinal importance recorded that these plants inhabit eco-edaphically diverse habitats ranging from plane areas through kandi (hilly areas) upto sub-alpines and alpines, at an elevation range of about 1550-4500m absl. In the recent past, the ever increasing human actions, overexploitation, illegal smuggling, excessive use in the traditional health care system, ayurvedic and unani medicinal system together with habitat destruction and their innate sensitiveness have rendered them rare and threatened. This necessitates a thorough study of threatened medicinal plants of Kashmir Himalayas to pave way for their conservation.

Introduction:-

The rich array of living organisms on the planet earth, together with its environment or ecosystem of which they are a part constitute its biodiversity. These life forms not only provide us various precious and valuable resources viz. food, fodder, fiber, drugs etc but are also source of key ecosystem services such as oxygen and water, Climate and pollution regulation, nutrient cycling and soil formation, ecotourism, aesthetic and educational purposes. Clearly ecosystem services are of gargantuan importance to human welfare even though the fiscal value of these services is inadequately qualified and principally unappreciated by mainstream economists (Myers 1996). There is however immense indecision as to the nature of the relationship between the provision of environmental services by the biological systems and biological diversity (Ghilaroo,1996; Benetesson etal., 1997).

Plants have been used in the traditional medicine for thousands of years (Abu Rabia 2005). The people living in the tribal and mountainous areas are very well aware about the medicinal importance of plants growing there and have therefore developed varied methods, rites and customs over a period of time to use these plants. It is pertinent to mention here, that ancient Indians were more acquainted with larger number of medicinal plants, than natives of any other country. This can be vividly observed from the ancient treatises like Materia medica, Ayurveda, etc. Moreover, with passage of time through trial and error people living in these areas have learned a lot about the medicinal usage of plants growing in their vicinity for treating various ailments. These people are of the opinion that all afflictions are caused by supernatural forces and if diagnosed properly can be treated effectively by using medicinal plants. This precious indigenous knowledge, when supplemented and validated by latest scientific insights, can offer a new holistic models of sustainable development that are economically viable, environmentally benign and socially acceptable (Shinwari S K *et al*., 2003).

India has huge diversity of plants, which are being used by local communities for medicinal purposes (Dutta B K *et al.*, 2005). Some 80% of world's population still relies upon plants for primary health care; even today in western medicine, and despite progress in synthetic chemistry, some 25% of prescriptions are still derived either directly or

indirectly from plants (Fowler 2006). It is interesting to note that the ethno medicinal uses of plants is one of the most successful criteria used by pharmaceutical companies in finding new therapeutic agents for the various fields of biomedicine (Williams; 2006). Some very important drugs have been developed from these plants such as reserpine (hypotensive) from *Rauvolfia serpentiana*, Quinine (antibacterial) from *Cinchona officinalis*, Pyrethrin (insecticide) from *Chrysenthemum cineriafolium*, etc.

Kashmir Himalayas is regarded as one of the most important centers for medicinal plant exploration and collection. This can be appreciated from the fact that a large number of people both foreigners and locals have travelled extensively through the forests of Kashmir for collection of plant materials. According to World Health Organisation (WHO, 2003) estimates, nearly 70% of the population in developing countries relies on traditional medicines for meeting their basic healthcare needs. In view of this serious pressure on the biodiversity of this fragile ecosystem, it becomes imperative to identify and conserve the rich flora for the sustenance of life and culture of present as well as future generations. During last few decades, although various ethno botanical studies have been carried out in the valley to document the information about the plant species, but unfortunately threatened medicinal plants have received least attention. Therefore it was aimed that a survey may be carried out to document the information about medicinally important threatened plants and to suggest measures thereof to check their exploitation so that they can conserved.

Study area:-

The study was carried out in the hilly areas of district Ganderbal, located at about 1550- 4500 mts absl, lying across 34°14' N latitude and74°47' E longitude. Ganderbal district is constituted of five tehsils viz. Lar, Wakura, Tulmulla, kangan and Ganderbal. The focus of study was on the kandi and mountainous areas of Lar and kangan tehsils, along the banks of river Sindh upto hilly and alpine slopes of Sonamarg. Owing to its diverse eco-edaphic and climatic features, the area is abode to large number of medicinally important plants which have been in use from decades, albeit without any conscious knowledge about their importance in modern medicine. The study area is part of North western folds which were recently designated as global biodiversity hot spot of Himalayas (Mittermeir *et al*., 2005). Kashmir valley is recognised as treasure house of medicinal plants (Dar *et al*., 2002). In this particular region of planet, the conventional use of herbs by locals for curing various ailments has been there from centuries.

Methodology and Data Collection:-

The methodology used was strictly designed with the aim of getting precious information on the ethno medicinal uses of threatened plants used by locals for various diseases. As such regular field trips from October 2012 to April 2014 were conducted along with structured interviews with the elderly people, Hakims (local practioners) and Gujjar Bakerwals residing in the areas and target group discussions. Most often they were accompanied for onsite identification of various plant specimens for authentication purposes. To prove the veracity of information, these specimens were later identified at Kashmir University Herbarium (KASH) and also few at Botanical survey of India (BSI) Dehradun. More over crosschecks with regard to uses of different specimens were carried out between the Hakims of different localities. All the relevant information about specimens like collection processes, part used, preparatory methods, recommended dosage were recorded in detail keeping in mind the importance of specimens.

Results:-

The current study describes the medicinal importance of some 26 threatned plant species belonging to22 genera and 16 families, that were and are traditionally used by local inhabitants with the advice of Hakims and elderly tribals for curing various ailments. The sudy reveals that almost all plant parts in one or the other specimen such as roots, rhizomes, leaves, stems, infloresence and seeds are used for treatment purposes. These parts are generally used after shade drying rather than in their fresh form, however in few decoctions fresh leaves are also used for medicinal prepration. Each specimen is provided with local name, botanical name,family, habit, part used, flowering peroid, uses and threat status. Mostly the plants are perrenial herbs but few bieenial herbs and shrubs were also recorded. The study also found that many pteridophytes, some bryophytes and few gymnosperms are also used for medicinal purposes, but there status as of now is not thretened however if their current rate of exploitation continues, it would not be far away that they too will find themselves under threat catogory list. In all there were 16 families recorded. The highest number of medicinal plants were found to belong to Asteraceae (5 species) followed by Ranunculaceae (3 species), Apiaceae, Lamiaceae, Scrophullaraceae and Polygonaceae (2 each), while rest of the families were represented by one species each. During the study it was observed that most of them are used as antipyretic, astringent, diaphoretic, febrifuge, analgesic, diuretic, laxative etc. for treating general health problems like cough,

cold, gastric problems, skin infections, liver disorders. The most prefferd part was underground part (roots and rhizome), followed by leaves and fruits. Seed of one plant *Colchicum lueteum* was also found to be used as diuretic.

Discussion:-

The plant species grow in diverse range of habitats raging from plains through kandi areas (montanous areas) subalpines, meadows and alongside banks of lakes found in alpines. They are distributed through wide altitudinal range between 1550-3400m (amsl). This part of Kashmir himalayas serve as a rich reserve for various medicinal plants due to its diverse eco-edaphic and climatic conditions. It was observed during the study that the gujjars living in these forests and the migratory bakerwals who migrate from Jammu areas during summer are by and large dependent on these wildly growing plants for medicine. Not only this, they do take with them a huge quantity of medicinal plants for their use during winters. By virtue of various preprations these plants are used to cure various ailments like external abrasions, cuts, bites of rodents and burns, few are orally taken to cure viseral ailments viz. digestive, respiratory and neural disorders, like asthama, diaorrhoea, jaundice, skin diseases, constipation, gastric diseases and gynaecological problems. Many have been and are used as spasmodic, analgesic, antiacids, antipyretic, diuretic, anti inflammatory and antiseptic. Different plant parts both fresh as well as dried forms are used in their crude forms however the mode of administration and dosage varies from species to species and also depends on season and the locality.

In the present study, it was oberved that the population of these important species is on the declining trend and the various factors which are considered as main threats to these medicinal plants as recorded from the local people include, the increasing interference of people into their habitats, overexploitation, overgrazing, deforestation, increasing market demand for raw materials of medicines, indulgence of unskilled persons in plant trade, burning of plant materials for making charcoal and more importantly illegal smuggling trade of these valuable plant materials. All these factors together with the sensitiveness of these plant species have resulted in the rapid decrease in the number of impotant medicinal plant resources. Since in the absence of any planned conservation progrrame the number of these valuable medicinal species will continue to decline and people in near future will only find their names in the textbooks, so the need of the hour to immediately start priority conservation programmes, declaring certain areas as no interfernce zones, initiate scientific harvesting of medicinal components from these plants, promotion of ex-situ conservation of endangered and critically endangered plant species and provision for technical guidence will definetly help in checking the depletion of these valuable plant resources in the suryeyed area.

Fig:1 Author documenting the information from local people.

Conclusion:-

The actual essence of ethano medicinal knowledge reflects experience of many generations and problem solving capacity of local people. Thus proves to be an important tool in solving many mysteries. It provides us a database for knowledge sharing between people involved in research, industry and physicians for sustainable exploitations of these valuable natural resources. It also gives us valuable oppurtunity for further phytochemical investigations, which is gaining more and more relevance in modern day treatments. It will help us in creating biodiversity repository for achieving conservation goals. More importantly, the documentation of these herbal bioresources will provide usan oppurtunity in curbing many biopiracy threats thus there is an immediate need for more and more ethnobotanic studies and conservation programmes for these plant species. Further studies is neded to isolate, characterize the pure compounds and evaluate their potential in drug devlopment and antimicrobial activity.

Table:1 Threatned Medicinal plants of Ganderbal (Kashmir Himalayas) based on IUCN Red data list (2013), Red Data Book of Indian plants (Nayar & Shatry,1988,1990, CAMP (Conservation Assessment and Management Plan, 2003) workshop and Peronal Observations of authors from the field studies.

S.No	Botanical name	Family	Local name	Life form	Part used	Uses	Flowering peroid	Threat status
01	Aconitum kashmiricum Stapx ex Coventry.	Ranunculaceae	Pevakh	PH	Roots	Lotion made from root powder along with few drops of mustard oil is massaged on joints, forehead and chest to treat headache and cough.	July- Aug.	CR
02	Aconitum violaceum Jacquem. Ex Stapf	Ranunculaceae	Mohund	PH	Roots / flowers	Root extact is used for tooth ache, back pain. Root powde paste is applied externally on boils and joints aginst pain. Flower extact for chest infections, cough, cold and liver disorders.	July-Aug	VU
03	Ajuga parviflora Benth.	Lamiaceae	Jani - Adam	PH	Leaves	Leaf powder syrup is used to treat intestinal infections, stomach problems and to cure cough. Leaf secreations are given to cattle for indigestion and fever.	Aug- oct	R+
04	Angelica glauca Edgew.	Apiaceae	Chora	PH	Roots	Root powder is taken with water for stomach problems, roots are given to cattle for treating diorrhea and alopecia in goats.	June-Aug.	EN
05	Aquilegia nivalis Falc. Ex Jackson	Ranunculaceae	Columbine	PH	Whole plants	Extract of herb is given to cows to increase milk yeild	May- Aug.	CR
06	Arnebia benthami I.M.jhonston	Boranginaceae	Kahzaban	PH	Whole plant	Decoction of rhizome in sugary water isused to alleivate cold, cough and fever, blood purifier	June-aug	CR
07	Artemisia absinthium L.	Asteraceae	Teethwan	PH	Leaves and flowers	Paste made from dried leaves and flowers, when taken with milk or water is used to cure stomach pain and worm infections.	July-Sep	R+
08	Bunium persicum B. Fedtsch	Apiaceae	Kala zeera	PH	Fruits	Fruits are chewed for reducing bad breath, dried fruits are taken with food as spice for curing digestive disorders. Roasted fruit powder is taken orally to cure joint pain,lumbago.	May-july	EN

09	Beriberis huegeliana	Beriberidaceae	Danelider	PH	Root bark	Dried root powder along with water is taken orally	May- july	R+
10	Colchicum luteum Baker.	Lillaceae	Virkim posh	PH	Seeds and Corms	Extract of corms is used in delivery bath to cure body pains, corm powder along with butter is used to cure back pain, weakness of bones and fever. Seeds are given against constipation and to induce sleep.	Feb -April	VU
11	Cypripedium cordigenum D.Don	Orchidaceae	Phoolan	PH	Rhizome and roots	Rhizome powder mixed with wheat flour is fried to prepare halwa which is then taken for treating arthritis, joint pain, chest diseases.	May-July	R
12	Dioscorea deltoidae Wall.	Dioscoreaceae	Kreath/ krees	PH	Tubers, leaves	Leaf decocation is used for treating opthalmic infections, tuber powder is used as detergent and to kill lice.	May- August	VU
13	Hyocyamus niger Linn.	Solanaceae	Bazer bung	BH	Leaf/ seeds	Leaves are used to relieve bronchial spasm, colic or excessive use of purgatives.Seed powder is applied on gums. Dried leaf powder is smoked with tobacco as sedative, paste of seed powder is applied on arthritic joints.	May- Sep.	VU
14	Inula racemosa Hook.	Asteraceae	Pushkar	PH	Roots	Fine root powder is taken mixed with milk or water to prevent chest infections and fever, also used for clearing phelgum from lungs.	June- July	VU
15	Jurinea dolomiaea Bioss.	Asteraceae	Douph	PH	Leaves/ roots	Tea made from root powder is taken to cure cough and cold. Paste of powder is used for wound healing. Leaf decoctin is highly energetic.	July-Aug	EN
16	Lagotis cashmeriana (Royle) Rupr.	Scrophulariaceae	Kasmiri Hear's ear	PH	Whole plant	Paste of leaves is applied on wound healing in cattle, rhizome is used as adultrant in place of *Picrorhiza kurrooa*	July-sep	CR
17	Lavatera kashmiriana Camb.	Malvaceae	Soze posh	BH	Aerial parts	Paste of dried flower in milk is used for treatment of mumps	June-Aug	R+
18	Megacarpaea polyandra benth.	Brassicaceae	Chatter	PH	Roots / leaves	Feshy roots are relished and eaten raw, leaf decocation is used as tonic,diuretic and blood purifier	July- sep	CR

19	Meconopsis latifolia	Papaveraceae	Guli neelum	PH	Roots	Rot powder is used as analgesic and antipyretic. Paste made from powder is used for treating bone frctures and inflammations	June-sep	VU
20	Prunella vulgaris	Lamiaceae	Kulwauth	PH	Flowers and leaves	Hot water bath of flowers cures general body pain, fever , headache. Paste made from flowers is used against chest problems.	May- July	R+
21	Picorrhiza kurrooa Royle.	Scrophulariaceae	Kound/ kutki	PH	Rhizome	Rhizome powderalong withwater is taken orally against ring worms, stomach disorders, intestinal infections; fermented powder (Khambier) is given in case in case of weakness, joint pains.	June – august	EN
22	Podophyllum hexandrum Royle.	Podophyllaceae	Banwangun	PH	Rhizome and fruit	Fruit juice is taken against stomach ulcers, root powder water is used against tumors.	May- August	EN
23	Rheum emodi Wall ex Meissn	Polygonaceae	Pamb chalan	PH	Rhizome and leaves	Paste of rhizome powder is used to cure wounds, boils and winter frost of body parts, leaves as vegetables	May- july	CR
24	Rheum webbanium Royle.	Polygonaceae	Latchu/ pambchalan ladhaki	PH	Roots leaves	Root powder is made into a fine paste and is used to treat joint pains,rheumatic pains. Ladhakis use it curind piles and bronchitis	June- sep	CR
25	Saussurea bracteata Decne.	Asteraceae	Saw wort	PH	Rhizome/ roots	Paste of rhizome with oil is applied for skin infections,burns, wounds.	July- sep.	R
26	Saussurea costus (Falc) Lipschitz.	Asteraceae	kouth	PH	Roots	Rhizome used as spasmodic in asthma,cough. Root powder mixed with mustard oil is massaged on skin to cure arthritis and paralysis of body parts under open sun. root powder mixed with sugar is taken orally to cure joint pains, stomach ulcers and kidney stones	May- july	CR

CR- critically endangered, EN- endangered, VU- vulnarable, R- rare, R+- rare observed by author through field studies, PH- perrenial herb, BH- bieenial herb.

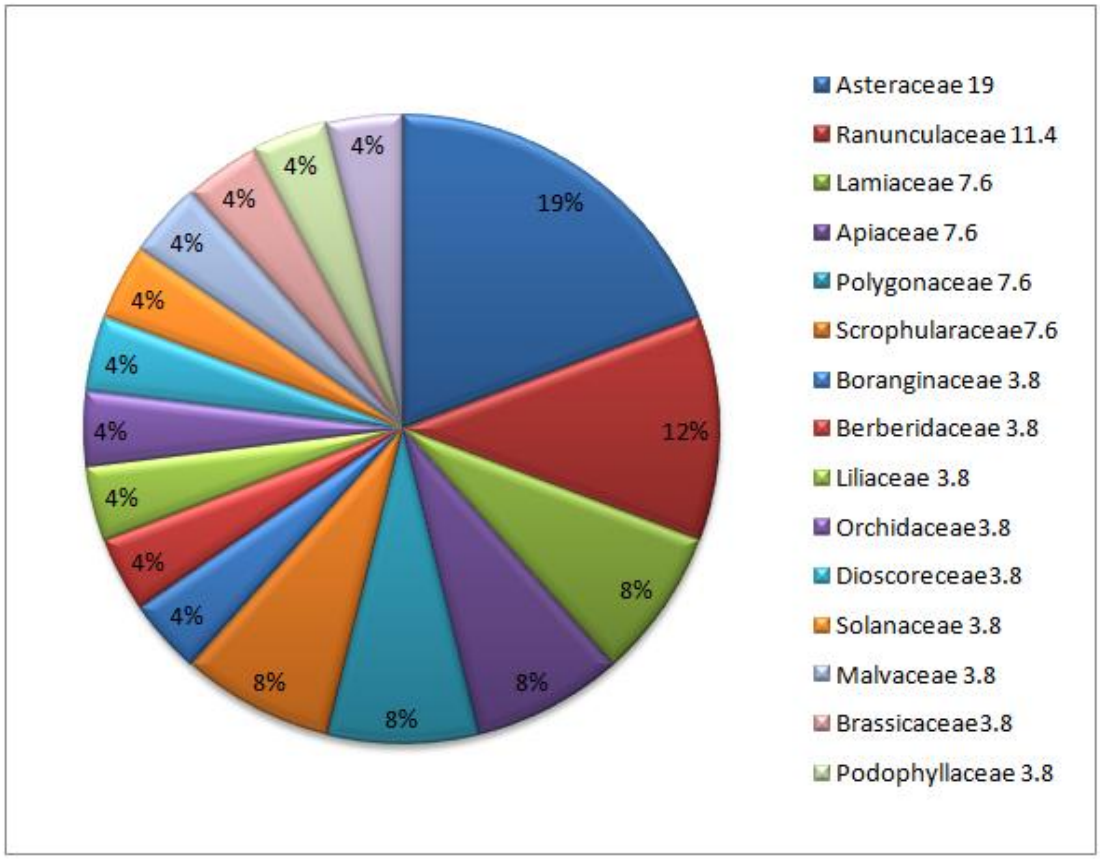

Figure:2 Percentage of collected plant species among different families.

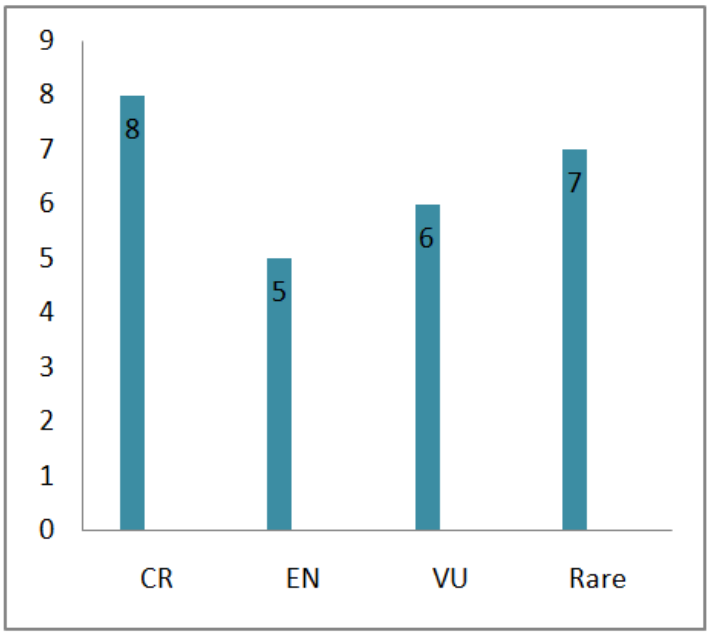

Figure: 3 Number of Medicinal plants in different threat categories

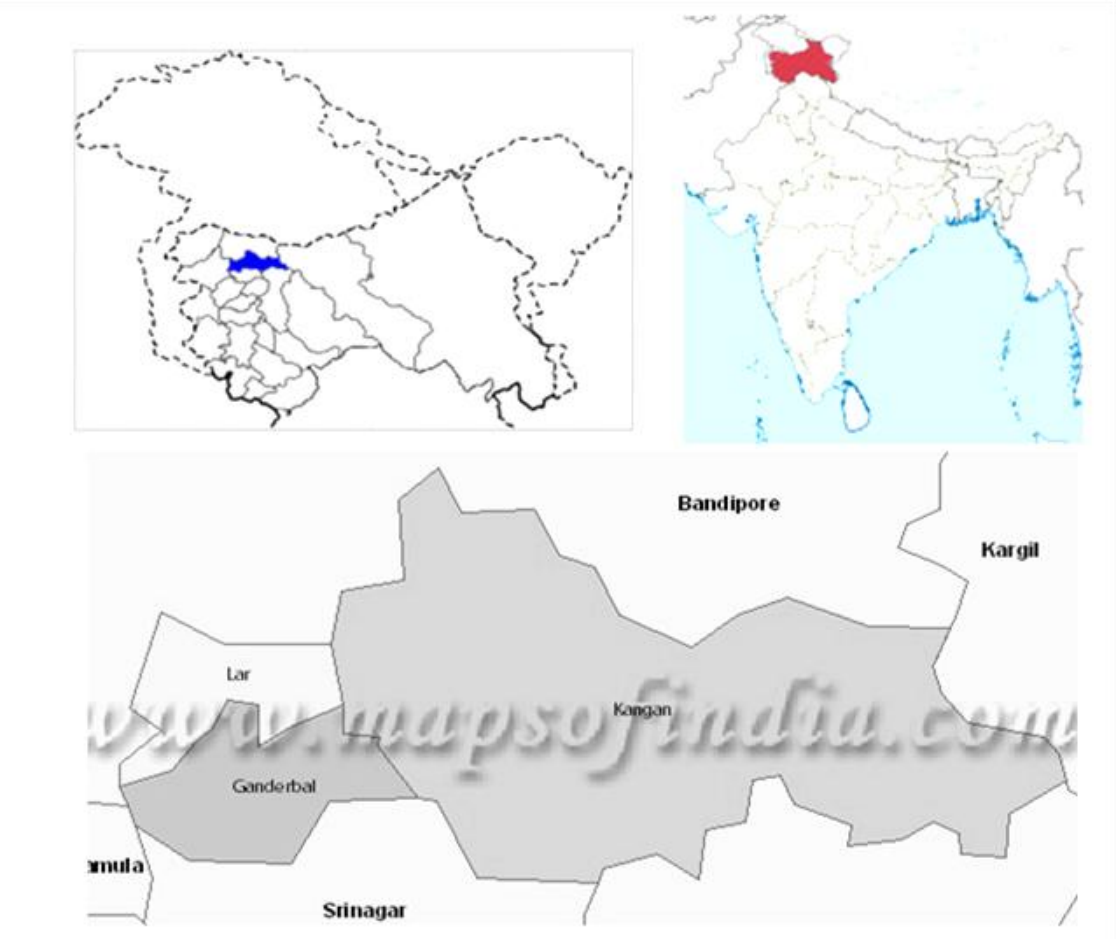

Figure: 4. Map of district Ganderbal, showing study area.

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Conflict of Interest:-

The authors declare that there is no conflict of interest.

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