

PRECLINICAL AND CLINICAL STUDIES OF PUTILOHA BHASMA ON DIABETES: A REVIEW

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ABSTRACT

Diabetes is turning global problem. It is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease. Different medicinal branches are striving hard to overcome this global problem at various stages of diabetes such as pre diabetic, diabetes and post diabetes complications. *Rasaushadhies* (Herbomineral Preparations) such as *Bhasmas* (Incinerated metals and minerals) in plays important role in Ayurvedic therapeutics. *Putiloha Bhasma* i.e. *Naga* (lead), *Vanga* (Tin) *Yashada* (Zinc) and *Trivanga Bhasma* indicated for diabetes since ancient times. But it is not explore due to unavailability of evidence based data on modern research models. Since attempts are going on by means of various preclinical and clinical studies, present paper aimed to review of these studies. After reviewing of papers on clinical and preclinical studies on *Putilohas Bhasma* it is observed that almost every *Bhasma* shows satisfactory results in reducing blood glucose level and improve glucose tolerance level in moderation. Therapeutic properties of *Naga*, *Vanga* and *Yashada Bhasmas* shows that it mainly act on *Vata*, *Kapha* and *Pitta* predominant *Vikara*(diseases) respectively. *Trivanga* contains all three metals hence its efficacy in terms of anti-hyperglycemic effect and pre and post diabetes complications should be rule out. For animal studies appropriate models which complete the criteria of *Ayurvedic* principles of treatment is very necessary in order to prove overall therapeutic properties. More clinical trial on these *Bhasmas* are needed to establish its rejuvenating properties and immune protective action which may prove rewarding.

Keywords: Diabetes, *Trivanga Bhasma*, *Putiloha*, Rejuvenating

INTRODUCTION: Ayurveda is ancient source of medical knowledge. Each and every new disease can be co-related with diseases described in our *Samhitas*. *Madhumeha* is one of them which can be correlated with Diabetes in modern medical science. Twenty types of *Prameha* is described in *Samhitas* if ignored and not treated properly in time can convert into *Madhumeha* and become incurable.¹

Now it is turning global problem. Prevalence of diabetes mellitus (DM) is rapidly rising throughout the globe at an alarming rate, where India leads with largest number of diabetics and became “diabetes capital

of the world.”² Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease and it is predicted that by 2030 diabetes mellitus may afflict up to 79.4 million individuals in India³. Different medicinal branches are striving hard to overcome this global problem at various stages of diabetes such as pre diabetic, diabetes and post diabetes complications. Earlier, herbs were extensively use due to their easy availability and processing techniques. However, later on, the therapeutic values of minerals and metals were also identifies and they occu-

pied an important place in *Ayurvedic* therapeutics.⁴ *Rasshastra* is the branch in *Ayurveda* that deals pharmaceuticals of metal and minerals. Due to specialized techniques of processing of *Rasaushadhies* (Herbomineral preparation), it attend special therapeutic properties which not only act actively on diseases but also possess immune protective properties. With the evaluation of Nano technology it is confirmed that Metallic *Bhasma* (Incinerated metals) contains Nano particles that enhance bioavailability of drug which facilitate target based drug delivery system. Mainly there are seven Dhatus (metals) mentioned in *Rasashastra* i.e. Gold, Silver, Copper, Iron, Lead, Tin and Zinc⁵ Although almost every Metallic *Bhasma* mentioned in *Rasshastra* plays important role in diabetes therapeutically, but some Metal *Bhasmas* are especially mentioned for diabetes i.e. *Putiloha Bhasma*⁶ (It smell foul while melting) *Naga* (Lead), *Vanga* (Tin) and *Yashada* (Zinc) and combination of these three called *Trivanga*. As these metals are cost effective as compare to other metals such as Silver and Gold, medicinal values of it needs to explore in terms of scientific researches. In this era of evidence based medicine, it is quite difficult to prove its anti-diabetic activity on the basis of exact chemical entity which act on insulin due to complex nature of these *Bhasma*. Since studies are going on to prove its therapeutic value in diabetes by various preclinical and clinical trials in order to get some clues, it will be interesting to understand exact pharmacokinetics of these *Bhasmas*. Once the active ingredients in *Bhasmas* are identified, these metal oxides can be synthesized and evaluated as a new chemical entity in modern drug discovery.⁷ Present paper is an attempt to put some evidence based facts about these

Bhasmas by reviewing some articles on Preclinical and clinical studies on diabetes.

Naga Bhasma (Incinerated Lead): *Naga Bhasma* mentioned as *Snigdha* (oily nature)) *Ushna* (Hot nature), *Guru* (Heavy to digest), *Lekhana* (Scrapping properties) and *Madhur-Tikta* (Sweet and bitter) in taste. It act as good appetizer, increases peristaltic movements, all types of *Vataja vikara* (*Vatadosha* dominant disorders) and alleviates *Prameha*.¹⁰

Deshmukh smita⁹ et al mentioned in study on *Naga Bhasma* in alloxan induced hypoglycemic rats to evaluate anti-diabetic activity. Graded doses of *Naga Bhasma* were administered orally (100 -200mg/kg) with suspension of milk in normal and control group showed no change in blood glucose level in normal rats. But normalize the impaired glucose tolerance and alloxan induced hyperglycemia in long term treatment. The research concluded with anti-hyperglycemic effect of *Naga bhasma* on prolong administration.

Naga Bhasma (Lead calx) at a dose of 60 mg twice daily for 28 days provided significant relief in all signs and symptoms of DM. FBS and PPBS were reduced significantly ($P < 0.05$). Moderate anti-hyperglycemic and no hypoglycemic action was reported in experimental animals.¹⁰

Vanga Bhasma (Incinerated Tin): *Vanga Bhasma* mentioned as *Laghu* (Easy for digestion), *Sheetal* (Cooling property) *Ruksha* (Dry) in its properties and little bitter and pungent in taste. Therapeutically it act on *Medovikara* (Obesity) *Kaphvikara* (*Kapha dosha* dominant disorders), Rejuvenate, all types of *Prameha* etc.¹¹ Wanjari Manish et al mentioned in the study conducted on alloxan induced diabetes rat in graded doses (25 and 50mg/kg) of *Vanga Bhasma* intragastrically in experimental and control group of rats

doesn't shows influence on blood glucose level but normalized impaired glucose tolerance level on long term use. This research concluded *Vanga Bhasma* on prolong administration exhibit anti hyperglycemic effect.¹² B.J.Patgiri et al (2014) concluded in the study for clinical evaluation of *Vanga Bhasma* on *Madhumeha* (Type 2 diabetes) that *Vanga Bhasma* when used with *Sahapana* (*Guduchi Ghana* and Honey) shows moderate anti-hyperglycemic effect in the patients as compare to other group with only *Sahapana* use for 28 days.¹³

***Yashad Bhasma* (Incinerated Zinc):** *Yashad Bhasma* mentioned as a *Katu* and *Kashaya* (pungent) in taste, *Sheetal* in *guna*. It is mainly beneficial in *Netravikara* (Eye disorders), *Pandu* (Anaemia), *Kapha pittaj vikara*, *Prameha* etc.¹⁴

V.Nageshwara Rao et al in the study conducted on streptozotocin induced diabetes of *Yashad Bhasma* for one month in aqueous suspension through oral route in the dose of 0.5g/kg body weight showed Blood glucose level returned to near normal by the end of the treatment.¹⁵

Umarani et al (2013) in the study conducted on anti-diabetes activity of *Yashad Bhasma* on streptozocine induced type 1 and type 2 induced rats for four weeks shows improvement in glucose tolerance level by 16-19%, lower blood glucose level by 20 -33% and reduced serum insulin level by 27-32%.¹⁶

***Trivanga Bhasma* (Combined Incinerated Lead, Zinc and Tin):** *Trivanga Bhasma* is used in *Ikshumeha*, *Haridrameha*, *Lalameha* (symptoms of pre diabetic state) and *Madhumeha*. It is specially mentioned in urinary complaints in *Madhumeha* such as urgency to micturate, frequency of micturition, dribbling of urine etc.¹⁷

The clinical study conducted on *Trivanga Bhasma* in comparison with *Asanada* (A Proprietary drug on diabetes) on 36 patients of diabetes with dose of 125mg TDS showed that *Trivanga* lowers blood glucose level fasting by 26% and PP by 21%. It is also observed that is more useful by 40% in urinary tract symptoms than *Asanad*.¹⁸

DISCUSSION: Ayurveda science is based on some fundamental principles which cannot be compromised at the cost of recent technological advances. Subjective parameters in patients is quite impossible to correlate with various experimental models of study. Mere rising blood sugar levels on animal models cannot correlate clinical factors involved in *Madhumeha*. Assessment of overall sign and symptoms along with objective parameters of *Madhumeha* will complete diagnostic criteria for the disease as the basis of treatment for any disease in Ayurveda depends on *Dosh-Dushya* (Pathogenesis), *Kala* (period of treatment), *Bala* (Physical and mental strength), *Vaya* (Age of the patients), *Prakruti* (Nature) etc.

An appropriate model addressing the above issues would certainly facilitate in designing research plans satisfying fundamental principles of Ayurveda. Well-designed experimental studies to validate the safety, biological activity, drug interactions, and possible mechanism of action possibly will provide tangible scientific evidence leading to clinical research. Following this, clinical studies adopting suitable models, research plans and scientific parameters may possibly provide a clear insight with a good translational value.¹⁹

After reviewing of papers on clinical and preclinical studies on *Putilohas Bhasma* it is observed that almost every *Bhasma* shows satisfactory results in reducing

blood glucose level and improve glucose tolerance level in moderation. Therapeutic properties of *Naga, Vanga* and *Yashada Bhasmas* shows that it mainly act on *Vata, Kapha* and *Pitta* dominant *Vikara*(diseases) respectively. Diabetic patient are predominantly seen with more or less *Tridosha*(*Vataj, Pittaj* and *Kaphaj*) based symptoms. As *Trivanga* contains all three metals hence possess all the properties of these three metals. But unfortunately very less studies are available on *Trivanga Bhasma*.

Trivanga Bhasma has very good therapeutic effect on neuromuscular symptoms of diabetes. so it is very important to carry out clinical studies on *Trivanga Bhasma* on diabetes to reach any concrete conclusion. Also rejuvenating properties of these *Bhasma* needs to study on complications of post diabetic patients such as Neuropathy, Retinopathy, Skin infections etc.

CONCLUSION: According to Ayurveda *Putiloha Bhasmas* are absolute in predominant symptoms in diabetes. *Trivanga Bhasma* contains all three metals hence its efficacy in terms of anti-hyperglycemic effect and pre and post diabetes complications should be rule out. For animal studies appropriate models which complete the criteria of Ayurvedic principles of treatment is very necessary in order to prove its overall therapeutic properties. More clinical trial on these *Bhasmas* are needed to establish its rejuvenating properties and immune protective action which may prove rewarding.

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