



Review Article

www.ijrap.net



ROLE OF RAJAYAPANA BASTI WITH REFERENCE TO DUCHENNE MUSCULAR DYSTROPHY: A REVIEW

Abeynayake Pemadasa¹, Jansz Manori^{2*}, Rajoria Kshpira³, Singh Sarvesh Kumar⁴

¹Ayurveda Medical Officer, Government Ayurveda Hospital, Embilipitiya, Sri Lanka

²MD Scholar, P.G. Department of Panchkarma, National Institute of Ayurveda, Jaipur, Rajasthan, India

³Lecturer, Department of Panchkarma, S.S.S.B. Ayurvedic College and hospital, Renwal, Jaipur, Rajasthan, India

⁴Lecturer, P.G. Department of Panchkarma, National Institute of Ayurveda, Jaipur, Rajasthan, India

Received on: 25/07/16 Revised on: 23/08/16 Accepted on: 11/09/16

*Corresponding author

E-mail: manori1jansz@gmail.com

DOI: 10.7897/2277-4343.075208

ABSTRACT

Duchenne muscular dystrophy is heterogeneous group of inherited disorders characterized by progressive muscle weakness and wasting. In Duchenne muscular dystrophy involves mutations in the dystrophin gene. Dystrophin is one of the large structural proteins in the cell membrane and absence of dystrophin leads integrity of muscle cells. Ayurvedic diagnose can be made as Adibala Pravrit Mamsa-Vata-Kshaya due to Srothorodha. No any specified treatment schedule in any medical field related to Duchenne muscular dystrophy. Therapeutic approach of muscular dystrophy is represents on corticosteroids, physical therapy, and respiration assistance and gene therapy or muscle transduction. The Ayurvedic treatments relevant to Rasayana group of herbo-mineral medicines and specified Panchkarma therapies have definite protective influence and long survival on Dhatu Kshaya according to Ayurvedic classics. Keep upon this view especially Rajayapana Basti is selected for present conceptual study because of its beneficial Sadhyo Balajanana and Rasayana effects. So this is an attempt has been made to review the relevant effect of *Rajayapana Basti* in Ayurveda with reference to Duchenne muscular dystrophy.

Key words: Duchenne muscular dystrophy, Adibala Pravrit Mamsa-Vata-Kshaya, Panchkarma, Rajayapana Basti

INTRODUCTION

The word dystrophy comes from Latin and Greek roots meaning of faulty nutrition. The disease was first described by Neapolitan physician Giovanni Semmola in 1834 and Gaetano Conte in 1836. However DMD was named by French neurologist Guillaume-Benjamin-Amend Duchenne in 1806-1875.¹ Duchenne muscular dystrophy (DMD) is known as x-linked recessive disorder. It affects muscles and lead weakness of muscular strength and function of muscles. This syndrome is marked by either generalized or localized. In DMD involve mutations in the dystrophin gene.² Dystrophin is cytoskeletal protein localized in the inner surface of the muscle membrane and it forms dystroglycan-glycoprotein complex.² This complex helps to maintain the integrity of muscle cells. So absence of dystrophin results in the destabilization of the entire dystroglycan-glycoprotein complex. So muscle mass is not growth well and cause to weakness of muscles. This condition is most apparent or symptomatic in skeletal muscle only heart and diaphragm muscle often involved. Most patients die because of heart failure or respiratory problems. Incidence of this is that affects 1 in 3600–6000 live male births worldwide.³ Each child of a carrier mother has a 50% chance of DMD. Though girls can be carrier, more than 80% shows no DMD related syndrome. No any treatment is at present in DMD definitely in any medical field. Therapeutic approach of muscular dystrophy is represents on corticosteroids, physical therapy, respiration assistance and gene therapy or muscle transduction. Gene therapy is already on research level and muscle transduction can further damage the weakened muscle. No universal agreement on which mechanism is predominant or how muscle is damaged when missing of dystroglycan-glycoprotein complex.⁴ Theories for muscle fiber necrosis may be mechanical hypothesis, calcium hypothesis,

gene regulation hypothesis or vascular hypothesis. In mechanical theory loss of dystroglycan-glycoprotein complex and in calcium hypothesis influx of calcium into cytosol both are responses to lead the damage of cell membranes. In vascular theory the lack of blood flow causes the typical degeneration of muscle tissue. Due to gene regulation, failure of certain molecules localized in the muscle membrane cause compromised in the cell integrity. An increase in the activity of muscle proteolytic enzymes may accompany the membrane alteration. Leaving of this cell membrane function is vulnerable to degeneration.

Suspect of DMD

Disease can be typically diagnosed at around in age 5 and loss of ability to walk by age 9-12 and succumb to death in second decade due to respiratory failure or cardiomyopathy. It is severe and has progressive muscle degeneration. Suspicions are usually raised by one of the following three signs even when there is no family history. (1) Problems with muscle function- child walk later than other boys their own age, they have enlarged calf muscles and have trouble running, jumping or climbing stairs and fall easily. They may have a tendency to walk on their toes and "Gowers" sign is positive. (2) High levels of muscle protein creatine kinase (CK) in a blood test. (3) High levels of the "liver enzymes" AST and ALT in a blood test. High levels of these enzymes in the blood are often associated with liver disease, but being progressive in muscular dystrophies.^{2,4}

Confirmation of DMD

DNA test, muscle biopsy analysis and prenatal test can be done for confirmation of DMD. High levels of CK (creatinine

phosphokinase-an enzyme) are seen in people with other kinds of muscle conditions and a high CK alone is not enough to confirm DMD.⁵ EMG (electromyography) could be done to confirm the diagnosis. EMG may confirm that weakness is caused by destruction of muscle tissue rather than damage to nerves. ECG (electrocardiography) can be done to monitor changes in cardiac status. Myoglobin Study in urine/ serum is often done.

Assessment criteria in DMD

Regular assessment should include tests is help show how the condition is progressing. It can be observed by strength of the particular muscles, range of joint motion, timed tests such as the time to get up off the floors time to walk a certain distance, time to climb several steps. Thereby gives important information on how the disease is changing and what sort of is responding to treatment. Motor function scales and activities of daily living also helps to identify the condition of disease.

Ayurveda aspect in DMD

Ayurveda diagnosis can be made as Adibala Pravrit Mamsa-Vata-Kshaya due to Srothorodha (obstruction in the microchannel). There is depletion of Mamsagni (~muscle tissue enzyme)lead the formation of Ama (indigested food)and it cause vitiation of Kapha Dosh. ⁶ During the process of Srothorodha produces hypertrophy in particular region even as first Prakop (augmented) and then depletion of Vata elements. This complex pathogenesis causes responsible for progressive wasting and necrosis of the particular muscle fibers which locate in the chief sites of Vata Dosh. Mamsa (muscle tissue) and Meads (fat tissue) etc are main constituent of our body.⁷Mamsa Kashaya (depletion of muscle tissue) may be present then the result get prolong vitiation of Majja Dhatu. (~vitiating fat tissue) .^{8, 9} This obstruction of channels is responsible for the Mamsadhata Kshaya.¹⁰ There is no any other excellent treatment for Vata Vyadhi such as Basti (enema)therapy.¹¹ Niruha Basti (decoction enema) is the superlative therapy in Panchkarma field and it has a pivotal ability to re-construct of damaged muscles or nerves.¹² Rajayapana Basti does priority which are supplying proper tone to the muscles & promoting the blood circulation with both Shodhana (elimination) and Brumhana (nourishing) properties of its own as well as very much beneficial which pacifies the provoked Vata Dosh, increases strength of the person, maintains health & longevity.¹³ Musthadi Rajayapana Basti mentioned under the Niruha Basti and it is the king of all Yapana Basti (~prolong enema) because of its superiority.¹⁴

Probable mode of action of Rajayapana Basti

According to Ayurveda Vata is the elan vitae, Vayu are the strength and Vayu is the sustainer of the living beings.¹⁵ So suppose how justice DMD may consider as under Vata Vyadhi. When Vata is vitiating in the body due to various Vata Prakopa Hetu (~causes of aggravation of Vata) it lead Dhatu Kshaya (~Degeneration of tissue elements) in the body.¹⁶ Rajayapana Basti is having Sadhyo Balajanana (quickly increase the power) and Rasayana (immunomodulation) properties means, it increase the power of the body and promotes strength of the body quickly.¹⁷ Rajayapana Basti should be added milk, meat soup or Majja, honey, ghee, ect.¹⁸Most of the drugs include in Rajayapana Basti are having Vatashamaka (pacifying Vata) and Rasayana effects. Bala (~strength of body) is depending on the Udana Vata (type of Vata) and its functions are manifestation of speech, effort, enthusiasm, strength and complexion.¹⁹ Diminution of these functions can be directly correlated with sign and symptoms of DMD. By this Sadhyo Balajanana and

Vatashamaka properties of Rajayapana Basti, normalize and enhance the action of Udana Vata even enriched the Rasa Dhatu (~nutrient fluid).Deepana (kindling of digestive power) Pachana (process of digestion) properties of Rajayapana Basti help to kindling of Agni (~enzyme complex).²⁰ Agni is very essentials for the formation of the Dhatus (tissue elements) and process of metabolic transformation.²¹ So all Dhatus are nourished properly where by Dhathukshaya (depletion of tissue elements) become reduce.

Rajayapana Basti can be given for a long time period. Colonic mucosa transport irons, small molecules and water through the colonic membrane back and forth between lumen and plasma as a systemic effect. So it can get absorbed Rasayana effects without involving of drugs metabolism which occurs in stomach. So directly and quickly body get effect of whole drugs. So body nourished quickly and longer time duration without any complication.²² Besides colon is enriched mucosal immune system. So immune system is even enhancing by the cleansing of colon. Drug can properly reach up to cell level due to removal of Srothorodha (~obstructions in micro channels) and helps to correction of Mamsagata Dushti (vitiating muscle tissue).According to Susrutha there is better absorption occurs in Rasayana drugs after the elimination process. So body will quickly get Brihmana.²³

Enteric nervous system (ENS) is immensely complex of neurons and present in the wall of gastrointestinal tract. This system mediates directly to regulate the intestinal blood supply and mucosal epithelial water and electrolytes transport.²⁴ Due to Sadhyo Balajana and Rasayana effect of Basti, the immensely number of nerves which located in ENS can get nourished directly. So can be supposed in DMD muscle weakness is getting decreased and muscles gets proper nourishment daily by given Rajayapana Basti.

Due to Madura (sweet), Guru (heaviness), and Jeevaneeya (rejuvenation) properties of milk gives Rasayana (immunomodulation property), Vrishya (aphrodisiac), Balya (strength), Medhya (nervine tonic), and Brihamana benefits.²⁵ Due to Yogavahi (~property to assimilate other properties of other drugs and procedures), Rasayana and Tridosahara (elimination of augmented Vata, Pitta and Kapha) properties of honey helps to nourished the muscles and scraps adhered Doshas (~morbid materials) from Srotas (micro channels). Paste helps to increase the functions of Brumhana & Balya (strength) upon the properties which they have and also gives required thickness to the Basti material. So Basti may be retained in Pakvashaya (large colon) for appropriate time. Due to Sukshma (subtle) property of rock salt it reaches up to the microchannel of the body. Due to its Tikshna (sharpness) property it helps to break down the morbid materials and Dosh Sanghata (~compactness of morbid materials).²⁶ Sodium iron fulfils essential action during absorption process of Basti. By the adding of ghee enhances Varna (complexion), Bala (strength), Rasa (nutrient fluid), Shukra (semen) and Ojasa (~vital nectar)in DMD due to the properties of Madura Rasa, Sheeta Veerya (cold potency) and Vatapittahara (pacifying Vata and pitta) properties.²⁷ According to Ayurveda Ojas be considering as the strength of the body.²⁸ Ayurveda classics emphasized should be used arid zone meat of animals for Rajayapana Basti because of these meats having mainly Vata alleviating property. So it also enriched in proteins and it helps fulfilled the lack of proteins in DMD. In Rajayapana Basti can be used bone marrow as an ingredient instead of Mamsa Rasa. When bone marrow is administered through Basti, it may act as bone marrow implantation.²⁹ It also helps to correction of depleted muscles in DMD. Rajayapana Basti drugs also enriched with Tikta Rasa

(bitter taste) dominance such as Dāruharidrā (*Berberis aristata* DC.), Guduchi (*Tinospora cordifolia* (Thunb) ect. In one study on spinal cord injury had been proved stem cells implantation due to Curcumin (diferuloylmethane) which is the active ingredient of Turmeric (*Curcuma longa* L.).³⁰ Turmeric is a Tikta Rasa (bitter taste) dominant plant. Thereby it may have positive impact on cell implantation by Tikta Rasa dominance and Tikta Rasa helps to reduce the degeneration of Asti (bone tissue) and Majja. It resultant to decrease of muscle wasting.³⁰
³¹By all these impacts which are adding to the Rajayapana Basti given logical and beneficial effect in the DMD to enrich their weakened muscles.

Preparation of Rajayapana Basti³²

40g of each herbal ingredient and 08 seeds of Madanapala (*Randia spinosa*) should be taken. Then be washed all well and cooked by adding 2.56l of water till one fourth of water remains. To this decoction should be added 1.28l cow's milk and boiled again until water is completely evaporated. To this liquid should be added 640ml of meat soup and cooked again. Then 10g of rock salt and 50 ml of honey are mixed together in mortar. Honey, is first of all poured and triturated well with rock salt. 50ml of cow's ghee is poured in the mixture of honey and rock salt and triturated well. To prepare paste 10g of particular powders in each is taken and adequate amount of water is added into it and mixed vigorously to obtain paste like consistency. Then it is added to the mixture and mixed well till the mixture become homogenous. Decoction and mixture in the mortar are

to be mixed and stirred well. 640ml of Basti Dravya (material of enema) is made lukewarmly by keeping it into hot water. Rajayapana Basti prepared according to classics like this way and it administered to the patient for appropriate duration which decided by physician.

There were not much more research and reviewed already done related to Rajayapana Basti in DMD. Most of the conceptual study had been done relevant to DMD which were collected or not this review etc. Several critical reviews have been done with reference to Rajayapana Basti related to musculoskeletal disorders which were mention here not directly to the DMD. Ongoing researches in DMD are axon skipping, stem cell replacement therapy, analog up-regulation, gene replacement and supportive care to slow disease.

CONCLUSION

In modern medicine there is no specified treatment for muscular dystrophy. So demand becomes toward the alternative approaches for contemporary treatments. Thus Panchkarma with reference to Rajayapana Basti can be shown logical and cost effective best influence due to its Sadhyo Balajanana and Rasayana effects. But Ayurveda never promises the cure of DMD whereas its approach gives quality of life and longer survival in the DMD patients. So it has being remained to postulate the hypothesis of Rajayapana Basti is best in the management of DMD as further clinical studies.

Table 1: Stages of Duchenne muscular dystrophy

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Pre symptomatic	Early ambulatory	Late ambulatory	Early non ambulatory	Late non ambulatory
Delayed milestones, speech	Gowers' sign, waddling gate, may be toe walking, climb stairs	Increasingly labored gait, losing ability to climb stairs and rise from floor	Able to maintain posture, may develop scoliosis	Upper limb functions and postural maintenance is increasingly limited

Table 2: Ingredients of Rajayapana Basti

Drugs	Generic name	Charaka Samhita	Sushruta Samhita
Musta	<i>Cyperus rotundus</i> L inn	+	+
Ushira	<i>Vetiveria zizanioides</i> Linn	+	+
Bala	<i>Sida cordifolia</i> Linn	+	+
Aragvada	<i>Caasia fistula</i> Linn	+	+
Rasna	<i>Alpinia officinarum</i> Hance	+	+
Manjishta	<i>Rubia cordifolia</i> Linn sensu Hook	+	+
Trayamana	<i>Gentiana kurroo</i> Royle	+	+
Punarnava	<i>Boerhavia diffusa</i> Linn	+	+
Patha	<i>Cissampelos pareira</i> Linn	-	+
Bibhitaka	<i>Terminalia belarika</i> Linn	+	-
Guduchi	<i>Tinospora cordifolia</i> (Thunb)	+	+
Salaparni	<i>Desmodium gangeticum</i> (Linn) DC	+	+
Brahati	<i>Solanum indicum</i> Linn	+	+
Tikta	<i>Picrorhiza kurroa</i> Royle ex Benth	-	+
Kantakari	<i>Solanum xanthocarpum</i> Schrad and Wendl	+	+
Prishniparni	<i>Uraria picta</i> (Jacq) DC	+	+
Gokshura	<i>Tribulus terrestris</i> Linn	+	+
Madanapala 08 seeds	<i>Randia dumetorum</i> (Retz) Poiret	+	+
Cow's milk		+	+
Cow's ghee		+	+
Honey		+	+
Meat soup (Arid zone animals)		+	+
Rock salt		+	+
Paste ingredients			
• Satapushpa	<i>Anethum sowa</i> Kurz	+	+
• Maduka	<i>Glycyrrhiza glabra</i> Linn	+	+
• Kutajapala	<i>Holarrhena antidysenterica</i> Wall	+	+
• Daruharidra	<i>Berberis aristata</i> DC	+	+
• Priyangu	<i>Callicarpa macrophylla</i> Vahl	+	-

REFERENCES

1. Nigro,G (2010). “One hundred seventy five years of Nepolitan contributions to the fight against the muscular diseases”Acta Myologica 29 (3):369-91. PMC 3146338. PMID 21574522
2. Bushby K, et al. The Diagnosis and Management of Duchenne Muscular Dystrophy, part 1: diagnosis, and pharmacological and psychosocial management, Lancet Neurology 2010, 9(1) 77-93.
3. Bushby K, Finkel R, Birnkrant DJ, et al. Diagnosis and management of Duchenne muscular dystrophy, part 2: implementation of multidisciplinary care. Lancet Neurol 2010; 9: 177–89.
4. Bushby K, et al. The Diagnosis and Management of Duchenne Muscular Dystrophy, part 2: implementation of multidisciplinary care, Lancet Neurology 2010, 9(2) 177-189.
5. Graham Douglas. Editor, Macleod’s Clinical Examination, Musculoskeletal systematic examination, 13th edition, Churchill Livingstone Elsevier publisher, 2013, p322.
6. Nair P Ramchandran et al (1980)., Pseudo-hypertrophy muscular dystrophy – An Ayurvedic Approach Journal of Res. In Ayurveda and Siddha 1:3 (429-437)
7. Bushby K, Finkel R, Birnkrant DJ, et al. Diagnosis and management of Duchenne muscular dystrophy, part 2: implementation of multidisciplinary care. Lancet Neurol 2010; 9: 177–89.
8. R. K. Sharma, Bhagwan Dash. Editor,Charaka Samhita, Chikitsastana chapter 28 verse 33,5th Vol, Varanasi,Chaukhamba Sanskrit Series Office,2013, p 29.
9. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Suthrasthana chapter 17 verse 65, 1st Vol, Varanasi, Chaukhamba Sanskrit Series Office,2014,p324.
10. Shailaja U, Rao PN, Girish K J, Arun Raj G R. Clinical study on the efficacy of Rajayapana Basti and Baladi Yoga in motor disabilities of cerebral palsy in children. AYU 2014;35:294-9
11. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Siddhastana chapter 1 verse 38-40,6th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013,p163-164.
12. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Siddhastana chapter 2 verse 16,6th Vol, Varanasi, Chaukhamba Sanskrit Series Office, 2013, p193-194.
13. R. B. Patil et.al. Evaluation of efficacy of Mahamasha Taila Abhyanga, Shashtik Shali Pinda Sweda, and Mustadi Rajyapana Basti in the Management of Pakshaghata w.s.r. To Hemiplegia: A Combine Therapy, Int. J. Ayu. Alt. Med., 2014; 2(4):73-78
14. K. R. Srikantha Murthy. Editor, English Translation on Illustrated Sushruta Samhita, Chikitsastana chapter 38, verse 111, 11th edition, Varanasi, Chaukhambha Orientalia publication, 2012, p 381.
15. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Chikitsastana chapter 28 verse 3,5th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013, p 19.
16. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Chikitsastana chapter 28 verse 20-24,5th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013, p 25.
17. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Siddhastana chapter 12 verse 16(1), 6th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013, p 408-409
18. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Siddhastana chapter 12 verse 15, 6th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013, p 407-408
19. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Chikitsastana chapter 28 verse 7,5th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013, p 20
20. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Chikitsastana chapter 15 verse 5,4th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013, p 03.
21. R. K. Sharma, Bhagwan Dash. Editor, Charaka Samhita, Chikitsastana chapter 15 verse 16,4th Vol, Varanasi, Chaukhamba Sanskrit Series Office,2013, p 11
22. Chaturvedi Ashutosh, Rao Prasanna N, U Shailaja,M Ashvini Kumar, Role of Panchkarma in Duchenne muscular dystrophy. Int. J. Res. Ayurveda Pharm 2013;4(2):272-275 DOI: 10.7897/2277-4343.04238
23. K. R. Srikantha Murthy. Editor, English Translation on Illustrated Sushruta Samhita, Chikitsastana chapter 27, verse 04, 11th edition,Vol 11, Varanasi, Chaukhambha Orientalia publication, 2012, p 257.
24. R.Sharma,G.Mangal, G.Garg Editors, Ayurvediyya Panchkarma Chikitsa, chapter 6, 2014 edition, Jagadish Sanskrit pusthakalya,Jaipur publication, p223,224.
25. Manori Jansz, Kshpira Rajoria, Sarvesh Kumar Singh. Panchakarma procedures along with Trayodashanga guggulu in the management of katishool with special reference to lumbar spondylosis. Int. J. Res. Ayurveda Pharm. Jul - Aug 2016;7(4): 50-54 <http://dx.doi.org/10.7897/2277-4343.074132>
26. Patill V.C. Editor, Principles and Practice of Panchkarma (A comprehensive book for U.G.,P.G.,Researches and Practitioners)., Basti Karma, chapter 13, 14th Edition, Chaukhamba Publications, 2014, p 415.
27. Bagde A.B., Sawant R.S., Yampallewar S.U., Nikumbh M.B., Dhimdime R.S, Ojas: The vital nectar of life. J Biol Sci Opin 2014;2(2):203-206
28. R. K. Sharma, Bhagwan Dash. Editor,Charaka Samhita, Suthrastana chapter 13 verse 14,1st Vol, Varanasi,Chaukhamba Sanskrit Series Office,2014, p 248.
29. Singh SK, Rajoria K. Ayurvedic approach in the management of spinal cord injury: A case study, Ancient Science Life 2015; 34:230-4.[PubMed]
30. Ormond DR, Shannon C, Oppenheim J, Zeman R, Das K, Murali R, et al. Stem cell therapy and curcumin synergistically enhance recovery from spinal cord injury. PLoS One 2014; 9:e88916.
31. Shailaja U, Rao Prasanna N, Arun Raj GR. Clinical study on the efficacy of Samvardhana ghrita orally and by matrabasti in motor disabilities of cerebral palsy in children. Int. J. Res. Ayurveda Pharm. 2013;4(3):373-377 DOI: 10.7897/2277-4343.04313
32. K. R. Srikantha Murthy. Editor, English Translation on Illustrated Sushruta Samhita, Chikitsastana chapter 38, verse 111, 11th edition, Varanasi, Chaukhambha Orientalia publication, 2012, p 381.

Cite this article as:

Abeynayake Pemadasa, Jansz Manori, Rajoria Kshpira, Singh Sarvesh Kumar. Role of Rajayapana basti with reference to Duchenne muscular dystrophy: A review. Int. J. Res. Ayurveda Pharm. Sep - Oct 2016;7(Suppl 4):7-10 <http://dx.doi.org/10.7897/2277-4343.075208>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: IJRAP is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publish quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IJRAP cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of IJRAP editor or editorial board members.