

## **“Cost Benefit Analysis (CBA) of the different therapies for the Autistic patients at a tertiary care hospital, in Bengaluru, India.”**

**Sandhya Dutta<sup>1</sup>, Dr. Bhumika Rathore<sup>2\*</sup>, Dr Gauravi Vyas<sup>3</sup>**

<sup>1</sup>Student for Master of Public Health, Poornima University, Jaipur, Rajasthan

<sup>2\*</sup>Assistant Professor, Faculty of Public Health, Poornima University, Jaipur, Rajasthan  
(Corresponding author – [rathorebhumika@yahoo.com](mailto:rathorebhumika@yahoo.com))

<sup>3</sup>Technical support Officer - Indian Institute of management Udaipur

### **ABSTRACT –**

**INTRODUCTION-** ASD is more prevalent in high-income countries. The disorder confers a financial burden on the affected families. Thus, this research was conducted to estimate the cost of illness of Autism in India and to estimate the cost-benefit of the therapies used in ASD.

**OBJECTIVE-** To compute direct costs, indirect costs, cost of illness, and the cost-benefit ratios.

**METHODOLOGY-** This study collected data from parents of autistic children aged 2-9 years. A cross-sectional study was conducted for a period of one financial year. An interview-administered tool was used for data collection. The analysis consisted of comparing the cost-benefit of standard therapies (occupational, speech, ABA) with and without probiotics.

**RESULT-** The benefits were found to be lower in terms of economics for the group where probiotics were added to the standard group of therapies. The financial burden of this illness in India would amount to INR 13,33,512 million.

**CONCLUSION-** The Burden of disease is high for ASD in India. Although the set of new therapies is costly but it is clinically efficacious and safe. Funds should be re-allocated through various governmental and non-governmental agencies to overcome the financial burden of such families for providing adjunctive new therapies to the patients.

**Key Words-** Cost Benefit analysis, Benefit cost ratio, Cost of illness, ASD

### **INTRODUCTION**

Over 80% of children with Autism Spectrum Disorder (ASD) are reported from high and upper-middle-income countries.<sup>(1)</sup> The disorder, which manifests only after 18 months, is on the rise in India, with a rough estimate of one in every 61 children. The cost of illness of autism has been estimated to be very high in other countries. However, the cost of illness has not been estimated for autism in India. Although therapies are available for this special group, but the literature is lacking pertaining to the cost-benefit analysis of these therapies. According to the literature, the lack of affordability to evidence-based care along with the stigma & discrimination faced by families of children with ASD, impacts parental well-being & their quality of life.<sup>(2)</sup>

As the financial burden of disease is high, we are conducting this research to estimate the cost of illness for this group of patients and to compute the cost-benefit analysis of the most common therapies used for this group in a tertiary care hospital in Bengaluru.

### **OBJECTIVES**

- 1) To estimate the direct and indirect costs included in the treatment of Autistic patients with & without Intellectual Disability (ID).
- 2) To estimate the cost of illness of a disease.
- 3) To assess the cost-benefit of the treatments used in autism.

## METHODOLOGY

A cross-sectional study was conducted to collect the data from the parents and caregivers of autistic children in the age group of 2 to 9 years. These Autistic patients were identified by a neurophysician & classified as subjects with ID & without Intellectual Disability (ID) since the literature suggests the cost of illness is much different in both cases. The cost of illness was estimated by including the direct and indirect costs. The direct costs included the cost of special schooling, nursing care, the cost of ASD related therapies & indirect costs included the wages of the parents, or the caregivers lost due to the time spent in care, the (non-healthcare) cost of logistics utilized by the parents to seek the treatment and if they spend anything on family care services. A tool was designed based on a pilot study, and ethical clearance was sought from the Institutional Review Board of Medipulse Hospital, Jodhpur, before beginning the data collection. An interview-administered questionnaire was utilized to record the sociodemographic factors, the direct costs, and the indirect costs. The therapies used for the treatment of autism at the tertiary care hospital include a combination of occupational therapy, speech therapy, and Applied Behavior Analysis (ABA) therapy. The costs of all three were taken into account. In addition to these mentioned therapies probiotics are being used as a therapy in addition to these therapies. Thus, this research includes two intervention groups for comparison through the Cost Benefit Analysis, utilising standard therapies with and without probiotics. All the benefits are measured in monetary terms in accordance with Cost-Benefit Analysis for the new and old set of therapies.

Convenience sampling was done at a tertiary care hospital in Bengaluru to collect data for 100 subjects.

Data was collected from parents and caregivers of these children after obtaining a duly signed consent form. It was undertaken that the identity of the child and the family would be kept confidential.

Cost-benefit analysis measures the benefits and costs in monetary terms. CBA also has a societal perspective since it includes all costs and benefits.

Steps involved in CBA <sup>(3)</sup> -

1. Define the health economics question- New v/s old drug - Is the new set of therapies better than the old set of therapies in the case of autism? The new set of therapies is considered to be more efficacious than the old therapy, but the addition of probiotics has made it a more costly treatment when compared to the old set of therapies.

2. Define the interventions - Set A of interventions (Old therapy) = Occupational Therapy, Speech therapy, and applied behaviour analysis. Set B of interventions = Occupational therapy, speech therapy, applied behaviour analysis, and Probiotics.

3. Define the perspective - Societal perspective, cost, and benefit. We would also take into account the loss of wages of parents or caregivers for seeking treatment for an autistic child. Also, the cost of illness would define if further advocacy should be taken up with NGOs, the government and the private sector to direct the funds for the treatment of autistic children.

4. Measure the total cost and benefit in monetary terms - Direct, Indirect, Intangible

Direct costs included the cost of special schooling, nursing care, and the cost of ASD related therapies. Indirect costs included the wages of the parents or the caregivers lost due to the time spent in care, the (non-healthcare) cost of logistics utilized by the parents to seek the treatment, and if they spent anything on family care services.

5. Calculate the net benefit and the benefit cost ratio - Cost averted due to the new treatment,

Incremental cost = Cost of new therapy - Cost of old therapy = Cost of set B- Cost of set A =

Rs 33,62,000- Rs 2269000 = Rs 10,93,000

Incremental benefit = Benefit due to new set of therapies - Benefit due to old set of therapies =  
Rs 600000

\*Benefit has been accounted as the cost averted due to the therapies.

The above accounts for Net Benefit, whether it is positive or negative.

6. Benefit cost ratio = Incremental benefit / Incremental cost = 600000/1093000 = 0.55

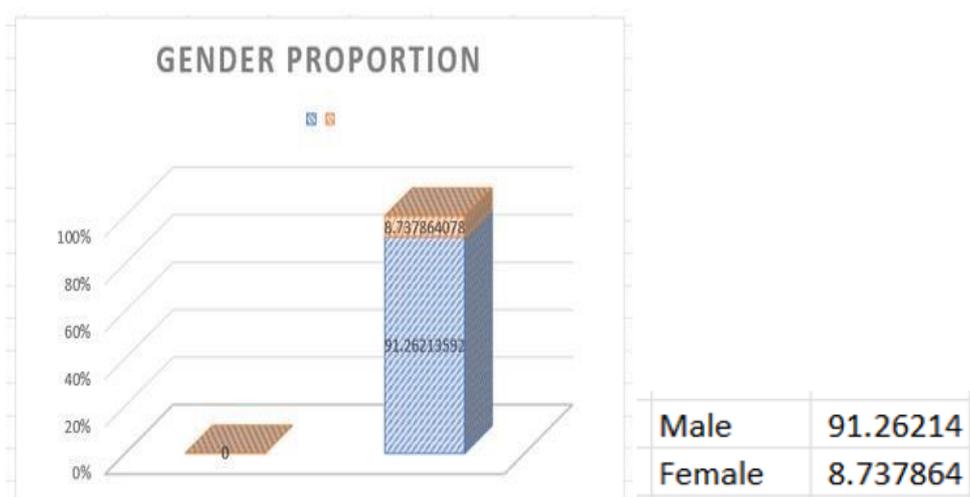
= 1 equal benefit of two therapies

>1 New therapy is beneficial

<1 New therapy is not beneficial

## RESULTS

Amongst the patients of ASD, 91.2 percent were males and 8.7% were female patients. All the children included in the research were in the age group of 2 to 9 years, with the average age of 6 years. All patients identified were without intellectual disability. 100 percent of the families enrolled in the study were found to have private health insurance.



The cost of illness was estimated using all the direct and indirect costs. The cost of illness was estimated to be 74,08,400 per year for 100 patients. However, a ratio of one in 69 children would translate to 18 million individuals suffering from ASD in India. Thus, the financial burden of this disease would amount to INR 13,33,512 million.

The benefit-cost ratio was estimated to be 0.54. Thus, the results suggest that although clinically useful, but the use of probiotics is not supported in terms of economics. Adjunctive therapies must offer a cost benefit to the patients or should be supported by external funding agencies to help the families of autistic patients.

## Discussion

The ASD age group was considered to be 2 TO 9 years as the diagnosis is most common during this age group<sup>(4)</sup>. It has been reported in literature that 70 % of ASD patients have an intellectual disability, however, this research reported none.<sup>(5)</sup> This could be due to the response bias from the parent or the caregiver that all patients were without any intellectual disability. The research also found the prevalence of ASD to be higher in males than females, which is supported by the literature.<sup>(6)</sup>

The cost of illness was found to be high for ASD in Bengaluru, India. However, a study in China has also concluded similar results about the cost of illness of ASD. The annual national cost of ASD was \$41.8 billion in China.<sup>(7)</sup> Although India has a higher population, the national cost was estimated to be \$15.56 billion for India. This may be due to varied methodology or the affordable health pricing of health services in India.

Cost-benefit analysis for autism has been done by various authors for a single intervention, however, this is the first research comparing the sets of interventions used for treating the signs and symptoms of autism.

### Conclusion

This study had the disadvantage of taking the average cost of therapies into account to compute the cost of illness. Intangible costs of discomfort or suffering were not included in the study. As all subjects recognized did not have any intellectual disability, this study was unable to measure the cost of illness for the patients with an intellectual disability. This research has been conducted at a tertiary care level, however, the parents or the caregivers might be facing financial challenges at other levels of care.

The burden of disease is high for ASD in India. Although the set of new therapies is costly, but it is clinically efficacious and safe. Funds should be allocated to overcome the financial burden of such families for providing adjunctive new therapies to the patients. Further research is suggested for similar disorders where the cost of illness could have a catastrophic effect on the family.

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