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Study incidence of Autistic Spectrum disorders among children with history of jaundice in Rajasthan Population.

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Abstract

Background: Autistic spectrum disorder (ASD) is a lifelong neuro developmental disorder characterised by un-natural social interaction, or participation due to hyperbilirubinemia observed in children.

Method: 98 ASD and 98 controlled group aged between 11 months to 3 years were studied. Every child was subjected to serum bilirubin test and some patients having more levels were subjected to phototherapy and obtained results were compared.

Results: 30 (30.6%) children were 11 months in ASD group, 32 (32.6%) were in controlled group 52 (53%) children ASD, 48 (48.9%) of controlled group were less than 2 year old, 16 (16.3%) of ASD, 18 (18.3%) controlled were 2 to 3 year old. Among them 8 (8%) of ASD, 9 (9.18) of controlled group were premature, 84 (85.7%) of ASD, 82 (83.6%) controlled had first born 6 (6.1%) of ASD, 7 (7.14%) born with multiple gestation. Mean value of Bilirubin in ASD group was 2.3 (SD±1.8) controlled group was 2.8 (SD±1.6) t test was -2.05 $p<0.04$ (significant). The profile of bilirubin was ≥ 10mg/d1 49 (50%) in ASD, 58 (59%) in controlled group, ≥ 15 mg/d1, was 26 (26.5%) in ASD, 10 (10.2%) in controlled group ≥ 20

mg/d1, level was 5 (5.10%) in ASD, 7 (7.1%) in controlled group. ≥ 2.5 mg/d1, 2 (2.04%) in ASD group, 3.06%) in controlled group 8 (8.1%) babies of ASD, 8 (8.16%) controlled group subjected to phototherapy 4 (4.08%) in ASD, 12 (12.2%) controlled having maximum levels ≥ 20 mg/d1 S. Bilirubin subjected to phototherapy.

Conclusion: The data suggests that hyper bilirubinemia is correlated with ASD, children must be treated meticulously and efficiently because ASD will persist throughout life.

Keywords: ASD, (Autistic spectrum disorders) Serum Bilirubin, Photo therapy Kernicterus, neurotoxic.

Introduction

Autistic Spectrum disorders (ASD) include a group of neuro developmental disorders characterised by impairments in 3 major domains socialization, communication and behaviour. ASD is a common neural developmental disorder in children and has increasing incidence [(1)(2)]. The causes are not well understood however the aetiology of ASD is likely a combination of genetic predisposition interacting with environmental factors in early life [(3)]. It was reported that, prevalence of ASD could be due to potential brain injury [(4)].

Neonatal unconjugated hyper bilirubinemia (jaundice) is very common in the new born period Bilirubin is a product of heme catabolism and at low levels a beneficial antioxidant, but at higher level is a neurotoxin to the normal development of neonatal brain. Bilirubin neurotoxicity has a spectrum of manifestation, with kernicterus being the most severe outcome among survivor [(5)]. Hence majority of ASD are related to hyper bilirubinemia. Hence the study was undertaken to assess the various levels of S. Bilirubin in ASD cases.

Material and Method

98 children aged between 11 months to 3 years admitted at sardar patel medical college, PBM and associated group of hospitals Bikaner, Rajasthan were studied.

Inclusive Criteria: Children having symptoms of autism is having neurodevelopment disorders characterised by persistent impairment in reciprocal social inter action and communication, sleep problem.

Exclusive Criteria: Children having epileptic seizures, Normal LFT (liver function test), congenital anomalies of crania or brain, were excluded from the study.

Method: 98 diagnosed Autistic spectrum disease and 98 (normal) controlled group were compared. Every child was subjected Serum Bilirubin ≥ 20 mg/dl. S. Bilirubin test was early morning (in empty stomach of the children) to get accurate results. These patients were

noted treated follow up was done, but apart from the treatment 90% of the children developed ASD. The duration of study march 2017 to April 2020 (three years).

Statistical Analysis: Both results of children were compared with t test and with percentage. The analysis was done in male and female children were 2:1

Observation and Results

Table-1: Comparative study of children with autistic spectrum disorder and controlled group 30 (30.6%) in ASD group were 11 months and 32 (32.6%) in controlled were one year babies

52 (53%) in ASD group and 48 (48.9%) in controlled group were 2 years babies 16 (16.3%) in ASD group and 18 (18.3%) in controlled group were 3 years babies.

Table-2: (a) comparison of serum Bilirubin Mean value 2.3 (SD±1.8) in ASD group 2.8 (SD±1.6) controlled group t test was 2.05 and p value was $p<0.04$ (significant).

(b) Maximum reported Bilirubin ≥ 10 mg/d1 was observed in 49 (50%) in ASD group, 58 (59.1%) in controlled group, SB ≥ 15 mg/d1was observed 26 (26.5%) in ASD group 10 (10.2%) in controlled group, S.B. ≥ 20 mg/d1was observed in 5 (5.10%) in ASD group, 7 (7.1%) in controlled group S.B ≥ 25 mg/d1was observed in 2 (2.04%) in ASD group, 3 (3.06%) in controlled group, 12 (12.2%) in ASD group, 8 (8.16%) controlled group received phototherapy.

Maximum Bilirubin level ≥ mg/d1 and baby received phototherapy was 4 (4.08) in ASD group, 12 (12.2%) in controlled group.

Discussion

In the present study, Autistic spectrum disorders among children with the history of jaundice in Bikaner population. The age of children was 11 months to 3 years. 30 (30.6%) of ASD group were 11 months and 32 (32.6%) were controlled group one year, 52 (53%) of ASD group, 48 (48.9%) were 2 year old, 16 (16.3%) of ASD group, 18 (18.3%) controlled group were 3 years old. Among them 8 (8.1%) of ASD group, 9 (9.18%) controlled group were premature birth, 84 (85.7%) of ASD, 82 (83.3%) controlled group were first born babies, 6 (6.1%) of ASD, 7 (7.14%) of controlled born by multiple gestation (Table-1). The Billirubin level Mean value in ASD group was 2.3 (SD±1.8), 2.8(±1.6) in controlled group t test was 2.05 $p<0.004$ (significant). The maximum profile of S. Bilirubin was 49 (50%) ASD group, 58 (59%) controlled group had ≥10 mg/d1, 26 (26.5%) ASD group, 10 (10.2%) controlled group had ≥15 mg/d1Bilirubin level, 5 (5.10%) ASD group, 7 (7.1) controlled group had

≥20 mg/d1S. Bilirubin level 2 (204%) in ASD, 3 (3.06) controlled group had ≥25 mg/d1level of S. Bilirubin 12 (12.2%) of ASD, 8 (8.16%) controlled received phototherapy 4 (4.08%) of ASD, 12 (12.2%) having ≥20 mg/d1also received phototherapy (Table-2). These findings were more or less in agreement with previous studies [(6)(7)(8)].

There is a biological pliability to suggest an association between bilirubin and ASD. Bilirubin is a known neurotoxin. The globes pallidus, cerebellum, hippocampus and sub thalamic nuclear bodies have been identified as areas in the brain vulnerable to bilirubin toxicity [(9)]. There is also an evidence of lower grey matter volumes in the putamen and cerebellar hyperplasia in individuals with autism, creating a degree of overlap that may indicate shared mechanism [(10)]. Moreover there are clinical features of bilirubin induced neurological dysfunction may cause abnormalities in secretion of neurotransmitter which results into muscle tone abnormalities, Senso neural, audio logical and visuomotor dysfunction, hyper excitable neonatal reflexes, neuro behaviour manifestations, speech and language abnormalities and intellectual disability[(11)].

Summary and Conclusion

The present study of ASD in jaundice children since birth to 3 years old children provides evidence that children un-conjugated hyperbilirubinemea is associated with development of ASD. Further prospective studies of genetic, histo-pathological, nutritional, hormonal studies in pregnant women are required to predict the un-conjugated hyperbilinemia because exact pathogenesis of correlation between ASD and hyperbilirubinema is still un-clear.

Table-1

Comparative study of children with Autism spectrum disorders and controlled group (98 cases and 98 controlled)

Sl No	Particulars	No	ASD cases (98) %	No	Controlled (98) %
1	Age up to 11 Months 1-2 year	30 52	30.6 53.0	32 48	32.6 48.9
2	2-3 years	16	16.3	18	18.3
3	Premature First born product of multiple gestation	8 84 6	8.1 85.7 6.1	9 82 7	9.18 83.6 7.14

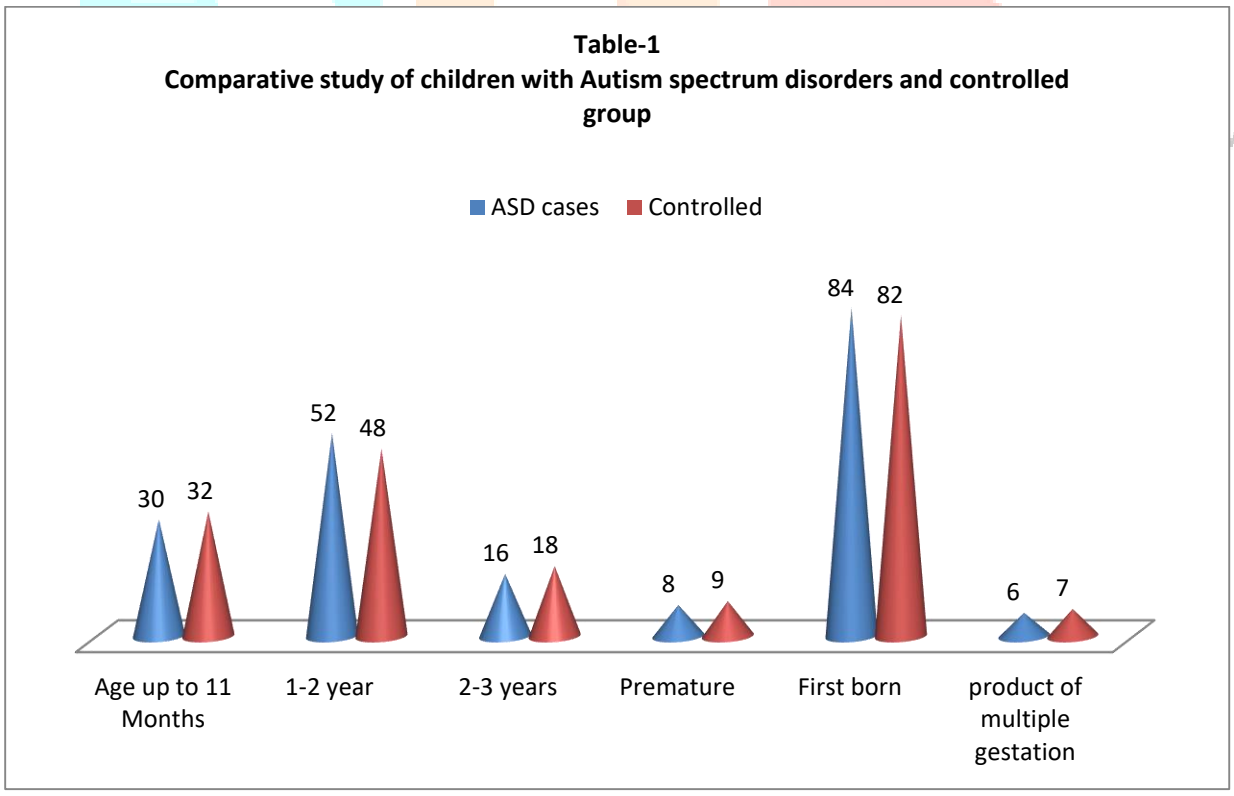
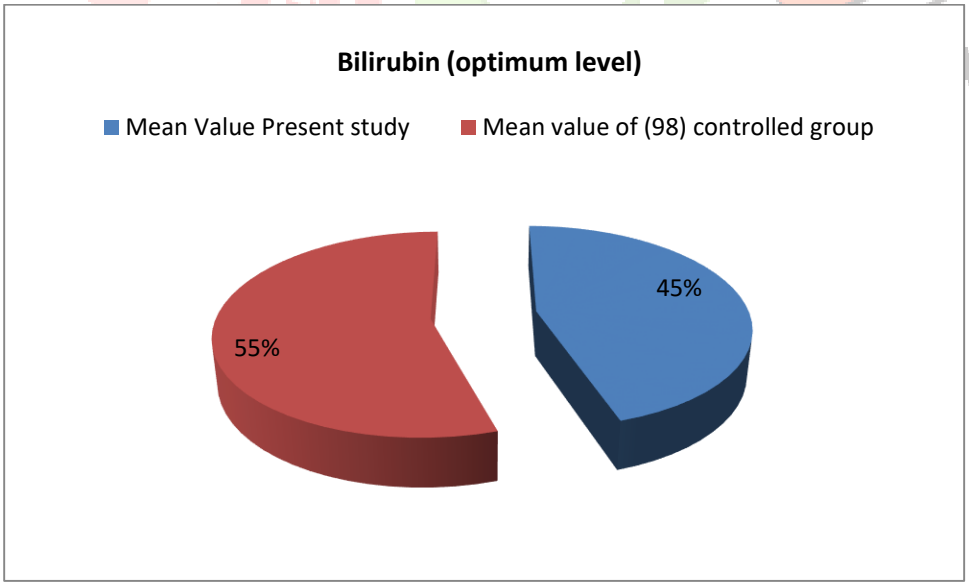


Table-2

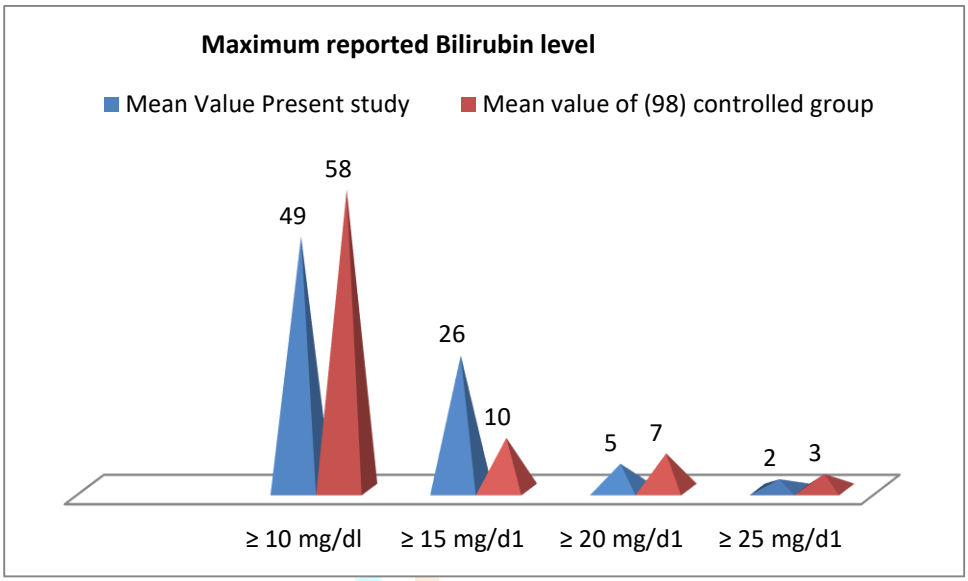
Study of Bilirubin levels and photo therapy

Sl No	Particulars	Mean Value Present study	Mean value of (98) controlled group	t test	P Value
a	≥ Bilirubin level (optimum level)	2.3 (SD±1.8)	2.8 (SD±1.6)	-2.05	P<0.04
b	Maximum reported Bilirubin level ≥ 10 mg/dl ≥ 15 mg/d1 ≥ 20 mg/d1 ≥ 25 mg/d1	 49 (50%) 26 (26.5%) 5 (5.10%) 2 (2.04%)	 58 (59%) 10 (10.2%) 7 (7.1%) 3 (3.06%)		
c	Baby received photo therapy maximum Bilirubrin Baby record photo therapy	12 (12.2% 4 (4.08%)	8 (8.16%) 12 (12.2%)		

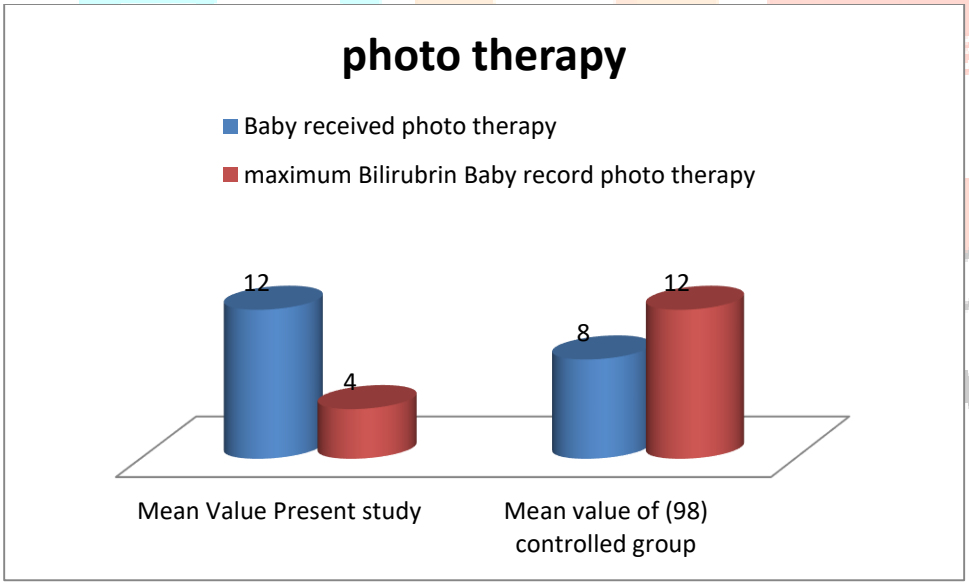
a) Bilirubin level (optimum level)



b) Maximum reported Bilirubin level



c) Photo therapy



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