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Review Article

STUDY OF THE ASSOCIATION OF ANTENATAL RISK FACTORS IN CHILDREN WITH LEARNING DISABILITY

**Deepika Tiwari., Surbhi Rathi., Alka Subramanyam., Pooja Rathi
and Santosh Kondekar**

Topiwala National Medical College, B.Y.L Nair hospital, Mumbai

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ABSTRACT

Learning disability (LD) is a heterogeneous group of disorders manifested by difficulties in the acquisition of reading, writing, reasoning or mathematical abilities. A broad range of environmental risk factors may affect neurodevelopment, including prenatal causes like maternal use of alcohol, tobacco, or drugs, stress, advanced age, obesity, hypothyroidism, preterm birth. Several epidemiological, obstetric adversities and prenatal risk factors associated with learning disability are either representing an epiphenomenon of the condition or derive from some shared risk factors, and their effect on neurodevelopment of fetus is collaborative effect of multiple interrelated patho-physiologies. Hence we decided to evaluate what is the burden of maternal risk factors over the causation of LD. Case control study was done with, sample size of 70 for both cases and controls. Mean maternal age in LD cases was 27.29 (with SD 4.69) with 7(10%) LD cases had history of advance maternal age at the time of conception. Pregnancy induced complications in mothers have highly significant association ($p < 0.01$) in LD; among pregnancy induced complications most prevalence was Preeclampsia 13(18.57%) followed by anaemia 6(8.57%). Pre existing medical co morbidity had significant association with learning disability ($p = 0.026$), most prevalent was hypothyroidism 3(4.29%)

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INTRODUCTION

Learning disability (LD) is a heterogeneous group of disorders manifested by difficulties in the acquisition of reading, writing, reasoning or mathematical abilities. A broad range of environmental risk factors may affect neurodevelopment, including prenatal causes like maternal use of alcohol, tobacco, or drugs, stress, advanced age, obesity, hypothyroidism, preterm birth. Several epidemiological, obstetric adversities and prenatal risk factors associated with learning disability are either representing an epiphenomenon of the condition or derive from some shared risk factors, and their effect on neurodevelopment of fetus is collaborative effect of multiple interrelated patho-physiologies. Hence we decided to evaluate what is the burden of maternal risk factors over the causation of LD.

Aims and objectives

Prevalence of significant antenatal risk factors in children diagnosed to have LD and association of other co morbid condition like Autism, ADHD, ADD, Seizures in these children.

MATERIALS AND METHODS

Case control study, sample size was calculated with Medcalc software V.11.3.3.0 .we took the sample size of 70 for both cases and controls. Children certified as having LD were included as cases and age, sex matched children attending school clinic having no academic issues taken as controls.

The cases were selected with the help of computer generated Random Number Table. These children were diagnosed as learning disabled on the basis of a comprehensive developmental, psycho educational evaluation at the medical centre by a team of experts including pediatricians, psychiatrists, psychologists, special educators and occupational therapists (for ADHD). Standard psycho educational battery which includes tests of academic excellence (eg. Woodcock Johnson test or WRAT) and tests of intelligence (e.g. WISC) were performed to aid the diagnosis. The diagnosis of co morbid conditions (ADHD) was confirmed by the consultant pediatricians and psychiatrists on clinical grounds and with DSM IV criteria. All children were evaluated for vision and hearing defects.

*Corresponding author: Deepika Tiwari

Topiwala National Medical College, B.Y.L Nair hospital, Mumbai

With consent of the mothers, detailed questionnaire regarding antenatal history and complete examination of children was carried out. The details prenatal, natal and postnatal history, sociodemographic, medical, personal, family, was recorded as stated by the mother and aided by old case papers when available. A detailed clinical examination of the child was carried out. Investigations as electroencephalograms, neuroimaging were noted if available. Software SPSS Version 17.0 was used for the analysis.

RESULTS

Male to female ratio found was 1.25:1. Mean maternal age in LD cases was 27.29 with 7(10%) LD cases having history of advance maternal age at the time of conception, found as significant association (p=0.01). Antenatal risk factors found significant (p value <0.01) were pregnancy related complications 25(37.5%), prenatal stress 20(28.6%) and pre existing medical illness 12 (17.1%).

Amongst the pregnancy related complications the most prevalent was Preeclampsia 13(18.57%) followed by anemia 6(8.57%) and Gestational Diabetes 3(4.29%). Hypothyroidism was found in 3(4.29%) mothers and was the commonest preexisting illness in the mothers of the children with LD. Co morbidities like ADHD was found in 13(18.6%) and ADD in 5 (7.1%) of the cases.

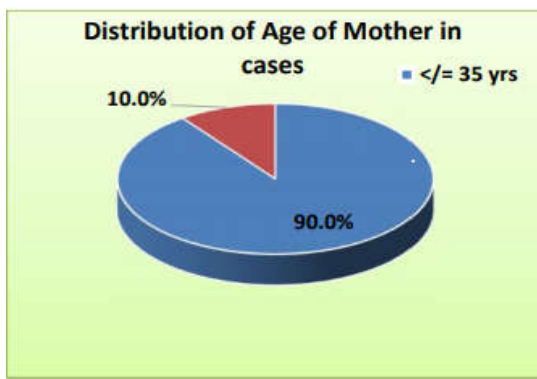


Fig 1 Distribution of mothers age in LD cases

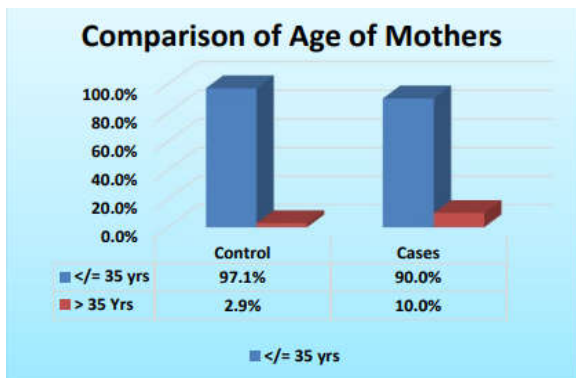


Fig 2 Comparison of mother's age in cases vs control

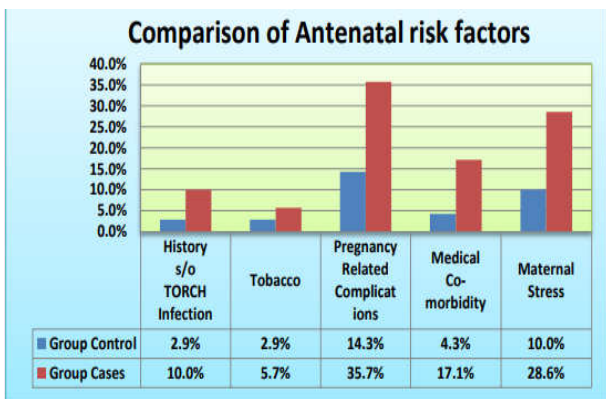


Fig 3 Comparison Of Antenatal Risk Factors In Mothers (Cases Vs Control)

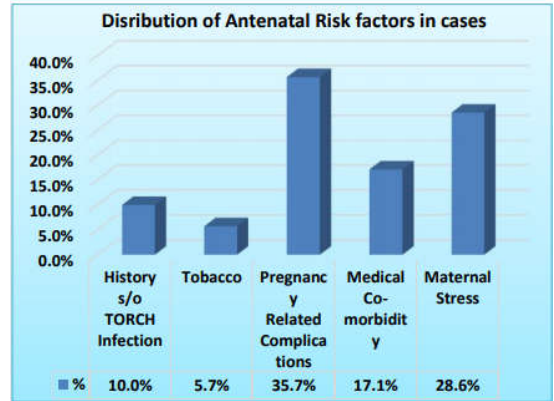


Fig 4 Distribution of Antenatal Risk Factors In Cases

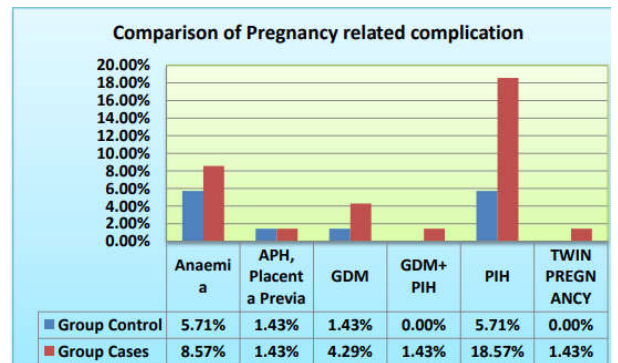


Fig 5 Comparison of Pregnancy induced complications in cases vs control

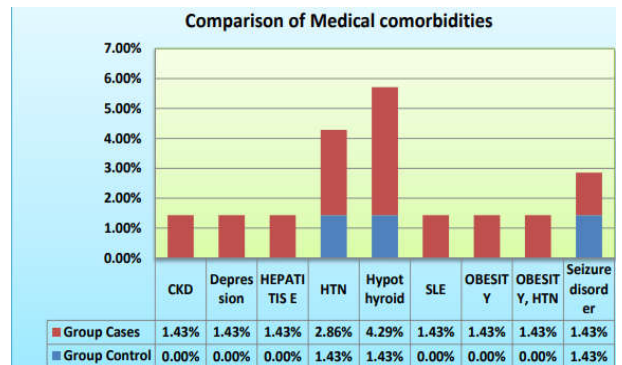


Fig 6 Comparison of medical co-morbidities in mothers in cases vs. control

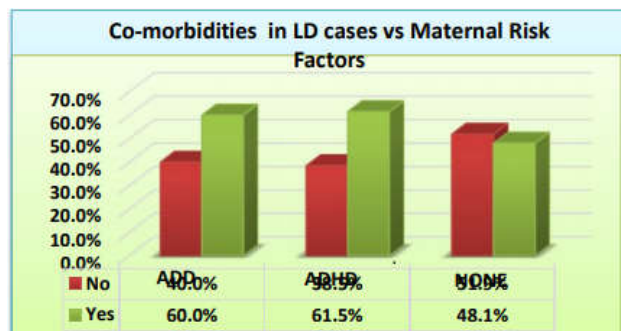


Fig 7 Comparison of co-morbidities in LD cases vs maternal risk factors

CONCLUSION

Mean maternal age in LD cases was 27.29 (with SD 4.69) with 7(10%) LD cases had history of advance maternal age at the time of conception. Pregnancy induced complications in mothers have highly significant association ($p < 0.01$) in LD; among pregnancy induced complications most prevalence was Preeclampsia 13(18.57%) followed by anaemia 6(8.57%) and GDM 3(4.29%) and 1(1.43%) cases each of placenta previa, twin gestation and GDM with PIH. Pre existing medical co morbidity had significant association with learning disability ($p = 0.026$), most prevalent was hypothyroidism 3(4.29%). ADD and ADHD though observed in children with LD in our study; was equally prevalent in both cases with and without associated antenatal risk factors. There's definite association of LD with antenatal factors. Even minor learning issues and cognitive difficulties in children with strong prenatal risk factors should be referred as early as possible for evaluation and early intervention.

Limitations

In a clinical setting, there could have been a referral bias. Also this data like antenatal history, birth history and developmental history is dependent upon memory of the parents which could have led to memory bias. Randomization and relatively smaller sample size limited the use of statistical analysis to validate the observations. Nevertheless, we believe the findings are important since few children in India get evaluated for specific learning disabilities. The implications of this study need to be determined by future studies.

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