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## “Prevalence of ADHD among school going children in a district in Manipur, Northeast India”

**Mayanglambam Puspa Devi**

Department of Teacher Education,  
Manipur University,  
Manipur, India-795003

**Koijam Sobita Devi**

Department of Teacher Education,  
Manipur University,  
Manipur, India-795003  
e-mail: puspa1942@gmail.com

### Abstract:

*Attention Deficit Hyperactivity Disorder (ADHD) is one of the most commonly occurring neurodevelopmental disorders of childhood. Its defining characteristics are a developmentally inappropriate level of inattention and/or hyperactivity/impulsivity. Children diagnosed with ADHD experience difficulties in their academic, social, or professional lives. The reported prevalence of ADHD in India ranges from 1.6% to 17.9%. 3%-5% of school-aged children are known to be affected by this disorder. A cross-sectional descriptive study was conducted among school-going children of Kakching District, Manipur. The study aims to screen school-going children for ADHD symptoms to find out the prevalence and study the association of ADHD with birth order, birth type, birth weight, and type of feeding of child. Vanderbilt ADHD Diagnostic Rating Scale (VADRS) was used for the present study. The prevalence of ADHD was 2.7%, with a statistically significant association with the type of feeding of the child. Early identification and prompt management of ADHD will be greatly aided by widespread screening for the disorder in schools.*

**Key words:** ADHD, prevalence, school going children.

### Introduction

Attention Deficit Hyperactivity Disorder is one of the most commonly diagnosed disorders of childhood (Biederman et al., 2000; Polanczyk et al., 2007). According to the Diagnostic and Statistical

Manual of Mental Disorders, Fifth Edition (DSM-5), ADHD is characterized by a persistent pattern of inattention and/or hyperactivity-impulsivity interfering with the functioning or development (American Psychiatric Association [APA], 2013). The prevalence of ADHD reported all over the world had high variability with as low as 1% and as high as around 20% among school-age children and adolescents (Bird, 2002; Faraone et al., 2003; Polanczyk et al., 2007; Polanczyk et al., 2015; Ayano et al., 2023). A systematic review and meta-analysis of 41 studies in India reported a point prevalence of ADHD ranging from 1.30% to 28.9% among children and adolescents (Joseph & Devu, 2019).

ADHD gives rise to difficulties among school children in terms of their academic performance, social interaction, vocational pursuits, and self-esteem (Biederman, 1998; Yewatkar et al., 2015; Krishna et al., 2023), causing impairment in their well-being and quality of life (Elia et al., 2008). Poor academic performance (Suthar et al., 2018; Ramya et al., 2017), learning difficulties (Chawla et al., 2022), learning disability, and social problems (Bhardwaj et al., 2019) were reported among ADHD children. Early identification of ADHD among children is crucial.

### Method

A cross sectional descriptive study was conducted in Kakching District, Manipur. The sample size for the study calculated by the Scalex SP calculator was 1025 (Naing L, et. al., 2022). From randomly selected eight schools in Kakching District, 1400 children reading in classes 1-8 were selected through random sampling, and they were given parent consent forms, Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS), and Personal Information Proforma. The investigators obtained parent consent and complete information of 1315 children. Out of the 1315 children, 47 children were ADHD-positive based on VADPRS.

Further, the Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS) was filled out by the teachers for these 47 children. Both the ADHD-positive criteria of VADPRS and VADTRS were met by 35 children. The investigators considered the response for 1303 children comprising 1268 ADHD-negative and 35 positive children for further analysis. Chi-square tests were used to test the association between categorical variables. In cases where the expected count was less than five in at least one cell, Fisher's test was considered. The statistical significance for the P-value was considered at 5%.

### Results

The prevalence of ADHD was 2.7%. Out of 35 ADHD children, 21 were 1<sup>st</sup> born, 11 were 2<sup>nd</sup> born, and three children were with birth order 3<sup>rd</sup> & above. ADHD was more among 1<sup>st</sup> and 2<sup>nd</sup> born children, but it was not significant (Table 1). Among the ADHD children, 24 children had a vaginal delivery, and 11 children had C- section delivery. The difference was not significant, with a p-value of 0.9 (Table

1). Likewise, there was no significant association between ADHD and birth weight of children (Table 1). Regarding the feeding type, 29 breastfed children had ADHD, and 6 bottlefed children had ADHD. ADHD had a significant association with the type of feeding (Table 1).

**Table 1:** Association of ADHD with the selected variables.

Variables	ADHD		P- value
	NO	YES	
Birth order			
<i>1<sup>st</sup></i> (688)	667(96.95)	21(3.05)	0.64
<i>2<sup>nd</sup></i> (431)	420(97.45)	11(2.55)	
<i>3<sup>rd</sup> and above</i> (184)	181(98.37)	3(1.63)	
Birth type			
<i>Vaginal delivery</i> (851)	827(97.18)	24(2.82)	0.9
<i>C-section</i> (437)	426(97.48)	11(2.52)	
<i>Forceps delivery</i> (14)	14(100)	0	
<i>Others</i>	1(100)	0	
Birth weight			
<i>Less than 2.5 kg</i> (116)	111(95.69)	5(4.31)	0.22
<i>2.5 -4 kg</i> (1147)	1119(97.56)	28(2.44)	
<i>More than 4 kg</i> (40)	38(95)	2(5)	
Feeding type			
<i>Breast feeding</i> (1217)	1188(97.62)	29(2.38)	0.02
<i>Bottle feeding</i> (86)	80(93.02)	6(6.98)	
<i>Total</i>	1268	35	

## Discussion

The prevalence 2.7% in the present study is relatively low compared to some earlier studies but it is in close agreement with the findings of other previous studies which reported low prevalence of 2.3% among children of age 6-12 years (Mannapur et al., 2016) and 2.2% among primary school children in Thailand (Sakboonyarat et al., 2018). There is wide variability in the reported prevalence of ADHD globally, and studies have shown a wide range of prevalence ranging from 1% to 20 % (Faraone et al., 2003). A review study of 19 studies on ADHD also reported a wide range of prevalence from 2% to 17% (Volkmar, 2003).

ADHD and Birth order

There was no significant relationship between ADHD and the birth order of the child. In agreement, Ndukuba et al. (2014) and Kiranmayi et al. (2018) also found no significant relationship between ADHD and the birth order of a child. In contrast, Catherine et al. (2019) reported a significant association between the prevalence of ADHD and the birth order of the child. Another study in Egypt by EL-Gendy et al. (2017) also revealed that increased birth order was associated with the risk of ADHD.

#### ADHD and Birth type

There was no significant relationship between ADHD and delivery type. Most children with ADHD had normal delivery (vaginal delivery), and a similar was reported by Sharma et al. (2020) and Ndukuba et al. (2014). It implies that intensive care should be taken during vaginal delivery so that there is no head injury or prolonged labor during the birth of the child because children with a mild and moderate head injury during birth have an increased chance of developing ADHD (Gerring et al., 1998).

#### ADHD and Birth weight

ADHD was found proportionately more among children with birth weight greater than 4kg, but it was not significantly associated. According to an Indian research by Sharma et al. (2020), 76.9% of children with ADHD were born weighing more than 2.5 kg, although the association was not investigated. Additionally, Kusuma et al.'s study conducted in Indonesia in 2023 discovered a negative association between birth weight and the likelihood of ADHD. While according to a study conducted in Jordan among primary school students (Abbasi et al., 2023), children who were born with low birth weight were more likely to suffer from ADHD than children who were born with a normal weight.

#### ADHD and Feeding type

ADHD was statistically significant with the feeding type of child. A study by Manjunath et al. (2016) reported that non-breast-fed children were at risk of ADHD and recommended promoting breastfeeding awareness. Another study found that a higher number of breast-fed children had ADHD compared to bottle-fed children (Sharma et al., 2020).

#### Conclusion

ADHD was prevalent among school going children in the Kakching District. ADHD was found to be significantly associated with the feeding type of child. Further large-scale studies and detailed diagnosis of school children involving psychologists/psychiatrists are suggestive. A mass screening for ADHD, along with an awareness programme for teachers and parents in schools, will immensely encourage early identification and timely management of ADHD.

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